NATIONAL NUCLEAR WASTE POLICY ACT

HEARING

BEFORE THE

SUBCOMMITTEE ON STRATEGIC AND THEATER NUCLEAR FORCES

OF THE

COMMITTEE ON ARMED SERVICES UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

ON

S. 1662

TO ESTABLISH A LIMITED PROGRAM FOR FEDERAL STORAGE OF SPENT FUEL FROM CIVILIAN NUCLEAR POWERPLANTS, TO SET FORTH A FEDERAL POLICY, INITIATE A PROGRAM, AND ESTABLISH A NATIONAL SCHEDULE FOR THE DISPOSAL OF NUCLEAR WASTE FROM CIVILIAN ACTIVITIES, AND FOR OTHER PURPOSES

MARCH 18, 1982

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NATIONAL NUCLEAR WASTE POLICY ACT

THURSDAY, MARCH 18, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

The subcommittee met in open session pursuant to notice, at 8:38 a.m., in room 212, Russell Senate Office Building, Hon. John Warner (chairman) presiding.

Present: Senators Warner, Thurmond, Stennis, Jackson, and Hart.

Staff present: James C. Smith, professional staff member; Francis J. Sullivan, minority staff director; Frank J. Gaffney and George K. Johnson, Jr., professional staff members; and Marie Fabrizio Dickinson, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; Will Smith, assistant to Senator Jackson; and Frank Krebs, assistant to Senator Cannon.

OPENING STATEMENT BY SENATOR JOHN WARNER, CHAIRMAN

Senator WARNER. The Subcommittee on Strategic and Theater Nuclear Forces reconvenes this morning.

S. 1662, the National Nuclear Waste Policy Act, was reported jointly by the Committees on Energy and Natural Resources and Environment and Public Works on November 30, 1981. By unanimous consent of the Senate the bill has been sequentially referred to the Committee on Armed Services for the consideration of certain provisions relating to defense nuclear waste.

Under this unanimous-consent request the Armed Services Committee must report the bill by March 25. A copy of that unanimous-consent agreement will be inserted in the record at this point.

[The unanimous-consent agreement follows:]

[From the Congressional Record—Senate, Mar. 8, 1982]

JOINT REFERRAL—S. 1662

Mr. BAKER. Mr. President, this request, I believe, has been cleared on both sides.

Mr. President, I ask unanimous consent that Calendar No. 393, S. 1662, the National Nuclear Waste Policy Act of 1981, be referred to the Committee on Armed Services for the purpose of permitting the committee to review the following provisions of the bill: section 202, section 203, and title VIII of the "Environment and Public Works" version of the bill; section 202 of the "Energy and Natural Resources" version of the bill; and the applicability of title VII of the "Energy and Natural Resources and Environment and Public Works" version of the bill to a licensed storage facility for radioactive waste from atomic energy defense activities.

I further ask unanimous consent that the Committee on Armed Services be obligated to report the bill by March 25, 1982, or be discharged from further consideration thereof.

The PRESIDING OFFICER. Without objection, it is so ordered.

Senator WARNER. It is very important, therefore, that we get this hearing completed today and proceed to a markup in the subcommittee and then to the full committee.

S. 1662 is an extremely important bill. It encompasses a major step in formalizing a program to close the nuclear fuel cycle. The commercial nuclear industry in this country badly needs this legislation to assure the American people that nuclear waste can and will be dealt with in a safe manner.

This committee is concerned with waste products from the defense side. As such, S. 1662 bears on our responsibility.

Section 202(b), requires that certain States' rights procedures found in title VII apply to any repository for defense nuclear waste. We have before us the question: Are these procedures appropriate for defense waste?

Section 202(c) of the Energy Committee's bill version precludes the storage of defense wastes in a civilian repository. Does it make sense to preclude storage of both defense and commercial waste at this point in time?

Section 203 of the bill, as reported by the Committee on Environment and Public Works, prohibits the use of commercial spent fuel for defense purposes. That is a very controversial issue and should be examined carefully by this committee.

Title VIII of the bill, again as reported by the Committee on Environment and Public Works, mandates a study on defense and commercial waste. A similar provision is already in law and it is not clear why this provision is necessary.

Our primary witness is Hon. W. Kenneth Davis, the Deputy Secretary of Energy. He has a prepared statement. He is accompanied by the Assistant Secretary for Nuclear Energy, Dr. Shelby Brewer, and the Assistant Secretary for Defense Programs, Mr. Herman Roser.

As you know, gentlemen, I am a member of the Senate Energy Committee and as such I worked on the bill that is before us today. I have a very active interest in this area of legislation and I am pleased that Chairman Tower has given me the responsibilty, together with members of my subcommittee, to prepare a markup for the full committee.

I look forward to working with you on this matter and, unless you have other suggestions, we will proceed with Secretary Davis.

Perhaps, Mr. Chairman, you have a few opening remarks.

Senator STENNIS. Senator Warner, I am just delighted to be here. I wanted to hear Mr. Davis. I am vitally interested and concerned about the entire subject matter.

One of the places under study is in our State and it is a matter that vitally concerns the people. The word "uncertainty" is sometimes used in reference to our economy and this subject is another big issue cloaked in "uncertainty."

I am delighted to be able to hear Mr. Davis' testimony. I support the Department of Energy and don't want to see it abolished really, but that is not the issue here today.

Senator WARNER. Recently I had the opportunity to visit the Savannah River project which under your jurisdiction as chairman much of that work was done. We have accomplished a great deal of research and development on defense nuclear waste at Savannah River and you have had a long association with this.

Senator STENNIS. Well, I thank you. You have contributed greatly since you came to the Senate in this field.

Well, I am going to stay. I am interested in everything that Mr. Davis says and I will have some questions if they are not already covered.

Thank you.

Senator WARNER. Secretary Davis?

STATEMENT OF HON. W. KENNETH DAVIS, DEPUTY SECRETARY, DEPARTMENT OF ENERGY, ACCOMPANIED BY SHELBY BREWER, ASSISTANT SECRETARY FOR NUCLEAR ENERGY, DEPARTMENT OF ENERGY, AND HERMAN E. ROSER, ASSISTANT SECRETARY FOR DEFENSE PROGRAMS, DEPARTMENT OF ENERGY

Mr. DAVIS. Mr. Chairman, I am pleased to be here today to discuss waste management legislation.

As you have noted, I am accompanied by Mr. Roser, the Assistant Secretary for Defense Programs, who I think hardly needs any introduction to this committee, and Dr. Brewer who is Assistant Secretary for Nuclear Energy. Between them they have the program management of our two waste management programs.

DEFENSE HIGH-LEVEL WASTE DISPOSAL

At this time I would like to comment on the administration's position on the provisions in this bill which address defense high-level waste disposal.

The Department of Energy believes that legislation addressing the disposal of commercially generated high-level waste is important to the nuclear energy option. Several provisions in S. 1662, such as the establishment of a fee system to finance the construction of repositories and the establishment of Federal/State relationships in repository siting decisions, are essential to a successful civilian nuclear waste program.

DISPOSAL OF DEFENSE WASTES IN A COMMERCIAL REPOSITORY

Section 202(a) effectively limits S. 1662 to civilian waste activities. Other provisions, however, address defense waste matters and should not be considered as a part of this legislation.

For example, prohibiting disposal of defense wastes in a commercial repository and legally excluding use of commercial spent fuel in weapons programs should be considered in a separate bill if Congress decides to act in this area.

The Department believes that these issues should not be addressed in S. 1662 or in any legislation covering the shipment, storage, or disposal of commercially generated high-level waste and spent fuel.

The administration is opposed to legislatively foreclosing the option of disposing of defense wastes in a commercial repository as

in section 202(c) of the Energy Committee's version of the bill. It is, we think, premature to make such a determination. If national defense or security programs are not jeopardized, it might be appropriate to utilize a commercial repository with payment of disposal charges.

RESTRICTION ON FUTURE OPTIONS

The DOE believes that the provisions of section 203 impose an unnecessary restriction on potential options that could be needed in the future. Given the importance of maintaining a clear distinction between peaceful and defense uses of nuclear energy, as well as the nonproliferation implications, the option of using civilian plutonium for defense purposes would only be considered if clearly essential for national security. Such an action would have to be approved at the highest level of Government and the views of Congress would be sought and weighed in making a decision. The provisions of section 203 are, therefore, premature and would unilaterally restrict U.S. defense options compared to our potential adversaries.

At some point there might be a need to shift facilities and materials from the commercial to the defense sector. This consideration was specifically included in the Atomic Energy Act of 1954. The proposed section 203 amendment would foreclose this option.

INTERNATIONAL AGREEMENTS

Under existing international agreements, the United States as a weapons state has the right to shift facilities and materials from the commercial to the defense sector. The U.S. agreement with the International Atomic Energy Agency provides the explicit right for the United States to remove safeguards requirements and shift facilities and materials to the defense sector if there is a national security need. All other nuclear weapons states which have agreed to IAEA safeguards have preserved similar flexibility. Those, of course, are France and the United Kingdom.

PUBLIC LAW 97-90

Sections 810 (a) and (b) of the Committee on Environment and Public Works version of the bill require the submission by June 1983 of a report similar to the report required by Public Law 97-90. This section, therefore, duplicates existing legislation. Sections 801 (c) and (d) require that DOE analyze by January 31, 1983, the utility of disposing of high-level waste from atomic energy defense activities in a commercial repository. The Department believes that such analysis should be addressed in the course of responding to Public Law 97-90.

Second 201(10) of the Environment and Public Works version defines high-level waste as any solid or liquid high-level waste from defense activities. This would include a large volume of very low-activity residues from high-level waste solidification and could increase disposal costs unnecessarily.

The Environmental Protection Agency is now developing a new definition of a high-level waste related to the actual hazard of the

waste rather than only its source. Section 201(10) should, therefore, defer to the EPA's definition in 40 CFR 191.

EXCLUSION OF DEFENSE-RELATED WASTES

I would like at this point, Mr. Chairman, to depart from my formal statement with a brief observation. As you know, my management and policy responsibilities encompass both the defense and civilian nuclear areas. It is my intent that both of these programs accomplish the objectives sent for them.

In that context I look upon the civilian nuclear activities and I see there the most urgent need to develop the legislative framework for permanent disposal of high-level nuclear waste.

As pertains to the defense-related high-level waste, Mr. Chairman, both you and I are cognizant of the existing legislative requirements for the administration to conduct a study and submit a plan to Congress by June 30, 1983. To me it seems both appropriate and wise to await completion of that study and the plan before attempting additional legislation with results that might on the basis of limited knowledge be prejudicial to the program.

On the other hand, I know that the civilian nuclear program needs the legislative support this bill provides for high-level waste. It cannot afford extensive delays that may be attributable to issues that are extraneous to it.

I urge, therefore, that this committee support the administration in its preference for excluding defense-related high-level waste from the scope of S. 1662.

In summary, sections 202(c) and 203, application of title VII to defense activities, and title VIII, should not be included in S. 1662 and section 201(10) should be modified as proposed.

This concludes my formal statement and I will be glad to answer any questions with the assistance of my two associates here.

Thank you.

Senator WARNER. Do either of your associates care to comment before we proceed to questions?

Dr. BREWER. No, sir.

Mr. ROSER. No, sir.

Senator WARNER. Mr. Secretary, I began a very intensive study of this subject both from the civilian and military standpoint and at the present time I have decided that it would be very wise to lay down a bill covering defense nuclear waste simultaneous with the consideration by the Senate of the civilian bill. Consequently, this week we will hopefully complete that bill with your help and introduce it in the Senate so that it is pending and ready for hearings before this committee in a timeframe commensurate with floor consideration of the civilian bill, S. 1662.

Before I proceed to questions, Senator Hart, do you have any opening comments?

Senator HART. No, Mr. Chairman. I welcome the hearing. This is a subject that I and some others on the Environment Committee have been struggling with for years now and I am hopeful we can work toward some long-term solution for both civilian and military waste.

Senator WARNER. Thank you.

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Senator Thurmond, do you have an opening statement?

Senator THURMOND. Senator, I have a short statement and then I have just five questions.

Senator WARNER. If you would like to proceed.

OPPOSITION TO ESTABLISHMENT OF A FEDERAL AFR PROGRAM

Senator THURMOND. Mr. Chairman, thank you for your courtesy. If you would permit me, I would like to ask a few questions about the Away-From-Reactor, the AFR title of S. 1662. Since I am not a member of the Energy or Environment Committees, this is my only opportunity to question representatives of the Department of Energy on this issue of great importance to the people of South Carolina and of the Nation. I will try to keep my questions very brief.

Dr. Brewer, in testifying in the joint Energy and Environment Committee hearings on S. 1662 you indicated the Department's opposition to the establishment of a Federal AFR program. As you may be aware, several Senators and I are planning to offer an amendment to S. 1662 when it reaches the Senate floor to delete most of the AFR title of the bill, an action which would be in keeping with the administration's and the Department's stated position.

In light of very serious concerns which have been raised regarding the need for a Federal AFR program and the fact that the Senate will soon have to vote on this important issue, I would like to ask the following questions.

First, what are the Department's most recent figures regarding the need for interim storage of commercial spent fuel and the dates by which such storage must be made available?

NEED FOR INTERIM STORAGE

Mr. DAVIS. Senator, my understanding is that our best information is that such storage might be required as early as 1986. I would like to refer to Dr. Brewer for any details on that since he is the one that has been conducting those studies.

Dr. BREWER. Senator, the first onsite storage pool which becomes exhausted in capacity is about 1986, and at that time several things could occur. Either the pool is enlarged, or there is transshipment to other pools, or it is shipped to another central repository or storage facility. But 1986 is about the time that it becomes a critical problem.

Senator THURMOND. What current efforts are underway at the Department to identify interim storage needs and to aid the utilities in meeting their storage needs, particularly those utilities with near-term storage problems?

Dr. BREWER. Senator, we have a program in the Department which is aimed at compacting fuel and technologies which will get more use or more volume out of the existing storage facilities; dry storage as well.

Senator THURMOND. What response has DOE received regarding its efforts to aid utilities with their storage problems?

AID TO UTILITIES

Dr. BREWER. I'd like to ask Dr. Coffman to address that.

Dr. COFFMAN. Senator, the Department of Energy has about a $7 million per year demonstration program that we coordinate with utilities. The slant of this program is to emphasize short-turn-around options such as dry cask storage and dry well storage which utilities could utilize at their reactor sites.

The response has been good to that. We have a program that began this year with the Tennessee Valley Authority using about 10 percent of a BWR core. This includes consolidating the core and putting it into a dry storage cask under license with the NRC.

Likewise, we have a program with Florida Power & Light wherein we take about 10 to 15 percent of a PWR core and put it into a commercially licensed dry storage cask.

Our hope is that those demonstration programs will provide the basis by which the utilities which have near-term fuel storage problems can apply directly to the NRC and resolve their AFR problems.

Dr. BREWER. Senator, if I might add to that, the issue of spent fuel storage is a very critical one, and one of great concern to the utilities. It is perhaps at the top of their list of priorities. One of the reasons for this backlog or this congestion of spent fuel is the lack of reprocessing capability in this country and the lack of a permanent geological disposal capability, something which this Government has been very tardy in providing.

Senator THURMOND. I assume that if the reprocessing had been allowed to go on at Barnwell, that would have helped to solve this situation.

Dr. BREWER. Absolutely.

Senator THURMOND. Commercial reprocessing was deferred by President Carter, of course.

Dr. BREWER. Yes, sir.

Senator THURMOND. I just have two more questions.

What are the Department's views regarding the technological feasibility and the timely availability of newer storage technologies such as fuel rod compaction and dry storage?

Dr. BREWER. Senator, those are the programs that Dr. Coffman just addressed and the technology is, in our opinion, adequate and ready to be deployed.

Senator THURMOND. Our amendment would leave intact, the expedited licensing provisions of title III. How helpful will these provisions be in reducing licensing uncertainty and delay?

Dr. BREWER. That would be helpful.

Senator THURMOND. Did you understand that, or do you want me to repeat that?

Dr. BREWER. Title III addresses the short licensing time, and that would be very helpful.

Senator THURMOND. That would be helpful?

Dr. BREWER. Yes, sir.

Senator THURMOND. Well, thank you gentlemen very much for answering these questions because they are of great concern and interest to many of our citizens.

I wish to thank the gracious chairman for his kindness.

Senator WARNER. Thank you very much, Senator Thurmond.

Senator Stennis?

Senator STENNIS. Mr. Chairman, you have Senator Hart here.

Senator WARNER. Senator Hart?

Senator HART. Thank you, Mr. Chairman.

In response to one of your answers to Senator Thurmond, is it not equally true that had the Congress resolved the political problems surrounding permanent disposal, that also would have alleviated some of the problems of the commercial industry?

DISPOSAL OF HIGH-LEVEL WASTES

Dr. BREWER. Yes, sir, that is correct. Our view is that the problem of ultimate disposal of high-level waste is not a technological one but it is an institutional, political, and local problem.

Senator HART. So there was an alternative to reprocessing and that was some political resolution of the permanent storage problem?

Dr. BREWER. Yes sir.

COMMINGLING DEFENSE AND CIVILIAN WASTES

Senator HART. Now, Secretary Davis, your statement to me was as interesting for what it didn't say as for what it did. In your statement, you oppose legislation that prohibits the disposal of defense waste in a commercial repository. As I understand it, the Energy Committee bill has such a prohibition in it. Is the Department of Energy considering the option of commingling defense and civilian waste?

Mr. DAVIS. Well, if one talks in terms of the final repository, I think that any final repository would have the physicial capability to handle wastes of various sources. Our view is that it is premature to decide at this time without knowing the schedules, without knowing the locations, and without knowing all of the characteristics of the waste to be stored, to make a decision as to whether or not it would be better to have separate repositories for military and civilian waste or whether they might in some repositories be combined. We simply don't feel we know enough about the matters that I mentioned to try to determine now, or even indeed within the next year or so, as to what the optimum situation is. The final repositories in all probability will be able to handle either waste.

Senator HART. So for the present time you haven't really made a decision on that as a policy?

Mr. DAVIS. We have not made a decision, no, sir.

Senator HART. Now, your prepared statement doesn't state whether you favor or oppose the provision in the Environment and Public Works Committee bill requiring a unified disposal system in that provision unless the President finds the national security interest in separate facilities outweighs the advantages.

What, if anything, can we infer from your silence on this issue with regard to that provision, if you would prefer to wait or what?

Mr. DAVIS. Well, I think our basic position is that we would rather not see the programs unified in the sense of trying to handle them in exactly the same way. We have, in fact, two paral-

lel and complementary programs to deal with the military waste, on one side, and with the civilian waste on the other side.

The problems we have at the moment are quite different on those two sides. In connection with the military waste, we have accumulated wastes in a fairly substantial volume. We have a continued buildup of those wastes and a probable acceleration in that buildup and we would like to immobilize those wastes and to take care of them as a matter of a production problem.

On the civilian side we don't have any significant quantity of waste on hand at the present time and probably won't for some time. The problem there is to identify the repositories and to demonstrate that we can safely and retrievably dispose of wastes.

So we view these two programs as complementary, aimed at the same long-term objective, but we would not in any case plan to manage the programs from a detailed program management point of view in the same way. They are on different schedules, they are in different places and they will use different facilities. It all depends really on what you mean by unified. They can be physically mixed or combined and that simply is not practical.

USE OF COMMERCIAL WASTE FOR MILITARY PURPOSES

Senator HART. Mr. Secretary, in your prepared statement you say that the option of using civilian plutonium for defense purposes would only be considered if, to use your phrase, "it is clearly essential for the national security," and that you would seek the views of Congress in making that decision.

I see the amendment which I and the Senator from Wyoming, Senator Simpson, offered as simply doing the very thing you suggest, that is to say, that it forces the Energy Department to seek the views of Congress by seeking a repeal of the prohibition if it is clearly essential for the national security.

I can assure you with some degree of confidence that if you can demonstrate the clear national security need for using commercial plutonium that Congress wouldn't hesitate to lift that prohibition. But until then this prohibition would guarantee that you would in fact seek the views of Congress as you have suggested.

Could you comment on that.

Mr. DAVIS. Well, I would first like to stress that we have no plans to use commercial waste for military purposes. I think, as I also stressed, though, that under our international agreements, this is something that we reserve the right to do. Certainly our preference would be not to have to depend on repealing a bill in Congress in order to proceed with that consideration if through some occurrences we should find that it was urgent to try to make some use of these commercial wastes. We don't anticipate that. It would only be in some kind of a future emergency. Clearly our preference would be to leave it in the way in which I have described and not to rely on Congress repealing a bill.

Senator HART. Well, I don't mean to quarrel over what might seem to be a procedural technicality, but I think the Congress is able to perceive emergencies as well as the administration and act on them. The Congress doesn't necessarily need to take weeks and months to make decisions. Bills can be passed rather quickly if the

need is demonstrated. So I don't think that a national emergency potential should argue against a congressional approval mechanism.

You also said, and I quote your statement,

> At some point there might be a need to shift certain facilities and materials from the commercial to the defense sector.

Could you suggest the facilities you might be referring to and what kind of need do you anticipate?

SHIFT OF FACILITIES FROM COMMERCIAL TO DEFENSE SECTOR

Mr. DAVIS. Well, one might, for example, shift reprocessing facilities. One might shift reactors. I think those would be the main elements.

Senator HART. Barnwell could become a defense facility?

Mr. DAVIS. It could if the need should arise at some time in the future. We have no such plans at present.

Senator HART. What kind of need would that be?

Mr. DAVIS. Well, I think the kind of need that might arise is if we had some breakdown in the production system and an urgent need for military production.

Senator HART. Therefore, a commercial reprocessing plant would then be used for military purposes?

Mr. DAVIS. Well, I think in the case of an urgent national need that I would certainly envision any of our facilities as being available if that was the requirement.

Senator HART. Finally, Mr. Secretary, you correctly noted that sections 801 (a) and (b) in the Environment and Public Works Committee are similar to the Jackson amendment to the Department of Energy's defense program's authorization bill. In the Environment and Public Works Committee we simply added two subsections, (c) and (d), to require also that the Department of Energy consider the advantages as well as the national security implications of disposing of defense and civilian wastes in a single repository.

You state that the Department of Energy intends to do this analysis anyway in preparing a report required by Senator Jackson's amendment. Because of that, what harm is there in simply requiring you legislatively to do an analysis that you seem to be planning to do anyway?

ANALYSIS OF DEFENSE AND CIVILIAN WASTE DISPOSAL

Mr. DAVIS. Well, I guess we don't see the virtue of having two independent requirements to do the same analysis. I think the dates are somewhat different, too, if I recall.

Senator HART. We might be able to reconcile those. I will take a look.

Thank you, Mr. Chairman.

Senator WARNER. Mr. Secretary, I want to go back over some of this ground and make a very tight record. So there may be some redundancy in these questions, but I feel it is important.

First, review the situation with regard to nuclear waste and cover both commercial and defense waste. Where does the waste come from, how much waste is there, how fast is the waste accu-

mulating, and where do we stand on a program to resolve the long-term handling problem?

Mr. DAVIS. Senator, those are fairly broad questions and I think we might try to provide some of that in more detail in response.

Basically we consider waste to be spent fuel which might be disposed of directly. This can come from the production reactors, in several forms, or from the power reactors. The high-level wastes arise from reprocessing as the concentrate, from the first cycle extraction, in liquid form, of the fission products which arise in the reactors. This waste we would then contemplate vitrifying or solidifying in some form and would then handle that waste in the solid form which is now of a high radioactivity level.

Or, potentially, again the fuel could be disposed as such. Most of the volume which we have today is, in fact, the defense wastes which have been built up over a very long period of time and has a volume of some 10 million cubic feet. The commercial wastes are almost insignificant in volume by comparision today, in terms of waste in the liquid form, being something like 100,000 cubic feet.

There is, however, a considerable volume of commercial spent fuel which has not been reprocessed. It simply exists today in the fuel pools of the reactors which is the problem that Dr. Brewer discussed that we have in effect spent fuel of a high level of activity sitting in these pools.

This, then, is the source of the problem and the wastes are accumulating from the production facilities at a fairly significant rate, primarily at Savannah River. The wastes are accumulating from the power reactors only in the form today of the discharge of spent fuel which is at the rate of, what, about 3,000 tons per year, Shelby?

Dr. BREWER. About 1,500 metric tons of uranium equivalent per year. That is about 60 gigawatts capacity on line now.

Mr. DAVIS. As far as where we stand on the problem of doing it, as I think I have mentioned, what we are seeking to do basically is, first of all, to reprocess the fuel and convert the wastes to a solid, and ultimately to dispose of those solid wastes in glass form, in all probability, in metal canisters in geologic formations deep underground. That is our basic long-range plan and we hope to, by around the year 2000, actually be placing, on a commercial scale, these wastes in these geologic formations.

[Additional information follows:]

HIGH LEVEL WASTE

Commercial high level waste is generated from the reprocessing of reactor fuel (as was done at the NFS plant at West Valley, New York, up to 1972). If it is decided to dispose of unreprocessed spent fuel, then it too could be considered as commercial high level waste. The NFS waste consists of liquid and sludge. Commercial transuranic waste arises in commercial fuel fabrication, reprocessing, and research and development facilities.

Defense high level waste is generated in the processing of fuel and target materials from nuclear material production or naval propulsion reactors and consists of liquid, salt cake, sludge, and a dry powder ("calcine"). Defense transuranic waste arises in fuel fabrication and processing, research and development, and weapon fabrication facilities.

At the end of 1980, there were approximately 0.1M ft^3 of commercial high level waste at West Valley and about 25,000 spent fuel assemblies stored at the reactor sites, containing a total of about 10,400M curies of activity. All commercial transur-

anic waste generated before 1980 was disposed of as low level waste in accordance with NRC or state regulations. About 133 kilograms and transuranic elements were buried in about 14.8M ft³ of low level waste at the commercial low level waste sites.

At the end of 1980, defense high level waste (in all forms) comprised about 10.3M ft³ and contained about 1,300M curies of activity. Before 1970, about 1,000 kilograms of defense transuranic waste were buried as about 9.6M ft³ of low level waste. Since then, DOE has retrievably stored about 2.2M ft³ containing about 800 kilograms of transuranics.

About 5,000 additional commercial spent fuel elements (containing 6,500M curies of activity), and about 0.1M ft³ of defense high level waste (containing 5.4M curies of activity) will be generated annually. Very little commercial transuranic waste is generated now, mostly in the decontamination of commercial facilities in the breeder reactor program. Approximately 0.2M ft³ of defense transuranic waste is generated annually.

The commercial waste management program is directed toward the use of mined geologic repositories, to accept high level waste, or spent fuel and transuranic waste, with reprocessed high level waste as the reference waste form. The program is focused on specific alternate sites for emplacement of a few hundred packages into an in-depth Test and Evaluation Facility (TEF). Primary attention is being placed on basalt at Hanford, tuff in Nevada, and on salt. There will be an early determination whether the sites meet standards being developed by EPA and NRC. The development of supporting technologies is continuing, including multiple barrier waste packaging. The long term goal continues to be a system of regional repositories. A license application in fiscal year 1988 for the first repository is the near term goal of the program.

The defense waste management program is focusing on the Waste Isolation Pilot Plant (WIPP), and the defense Waste Processing Facility (DWPF). The WIPP will demonstrate disposal of defense nuclear wastes through routine receipt and emplacement of pilot-plant quantities of defense transuranic waste, and through experiments with defense high level waste. The DWPF will immobilize defense high level waste for storage, transportation to, and disposal in a geologic repository. The DWPF products will be available for experiments in the WIPP.

Senator WARNER. It seems to me that we have made good progress in the defense area on the R. & D. Would you agree with that?

Mr. DAVIS. Yes, sir, the programs I have seen seem to be leading to substantial demonstrations of concentrating the wastes and converting them to a solid form such as glass and placing them in canisters. This has been done at Savannah River and Hanford and there are actual solidified wastes in both locations.

Senator WARNER. Compare the hazard levels of defense wastes versus commercial wastes and which represents the greatest challenge for long-term storage?

LONG-TERM STORAGE REQUIREMENTS

Mr. DAVIS. Well, in the long run, we certainly will have a considerably larger volume of the wastes from the civilian program than we will from the military program. At the present time, we have a much larger volume, as I have mentioned, of the wastes which have been accumulated and are continuing to accumulate from the military program. I think I have already given you the numbers in terms of volume.

In terms of the activity, the amount of activity in the spent fuel, of course, exceeds by a great amount the amount of activity in the accumulated waste from the military program, but in this case it is in the form of fuel rather than waste in tanks.

We do have some figures which would indicate that by the year 2000 in terms of actual volume, and I guess in this case it is of the liquid wastes, we are talking 11.8 million cubic feet, which is a small increase from today, in the waste from the military program,

but in the civilian program the volume would have increased to about 1.3 million cubic feet.

Senator WARNER. You mentioned the activity. Could you give me the numbers for both categories?

Mr. DAVIS. Let me suggest also we give you this table for the record.

The activity in 1980 for the defense waste now is about 1,300 megacuries. By the year 2000 this would have grown to about 1,600. The commercial waste in terms of the activity of the spent fuel now, which is not a liquid waste, is about 10,400 megacuries and would grow to about 55,000 by the year 2000. This is spent fuel, of course, today.

[The table follows:]

	1980	2000
Defense waste:		
Volume (millions of cubic feet)	10.3	11.8
Activity (millions of curies)	1,310	1,620
Thermal power (millions of watts)	3.4	4.8
Commercial waste:		
Volume (West Valley) (millions of cubic feet)	.1	.1
Volume (spent fuel) (millions of cubic feet)	.1	1.3
Volume if spent fuel processed (millions of cubic feet)	.3–.4	3–4
Activity (West Valley) (millions of curies)	39	37
Activity (spent fuel) (millions of curies)	10,400	55,000

Senator WARNER. Would a generalization be about 10 to 1 now and it could go as high as 50 to 1 by the year 2000?

Mr. DAVIS. Yes, sir. It will be very much higher on the civilian side by then.

Senator WARNER. When we deal with this question on the Senate floor one of the issues will be which program for the long-term handling of nuclear waste is further along—the commercial waste program or the defense waste program?

PROGRESS OF DEFENSE AND CIVILIAN WASTE PROGRAMS

Mr. DAVIS. The programs, as I mentioned, are moving along somewhat in parallel. The development work that has been done on the immobilization has essentially been done on behalf of both programs, but it is being applied more directly now to the defense program waste. The development work aimed at the eventual repository again is not very specific as to what kind of waste would eventually be stored in the repository since they are similar, but that program itself is being carried on primarily on behalf of the civilian program, although it could have applications to both.

I think it is very hard to say which is ahead of the other. They are, in fact, complementary programs, both proceeding in parallel.

Senator WARNER. Would it appear that maybe the defense waste program is going to be solved before the commercial one?

Mr. DAVIS. I think the defense waste program in terms of actually putting the waste into solid form certainly is going to be handled and has to be handled as a production matter before the problem of converting the civilian waste to solid form is handled or needs to

be handled. Eventually they will both come together at about, I would think, the same time in terms of the final repository.

Senator WARNER. I have further questions, but at this time, Senator Stennis, do you have questions?

Senator STENNIS. Well, thank you, Mr. Chairman.

I will be brief, Mr. Chairman. I am vitally concerned about this matter. Of course, the military needs and demands have to be taken care of, but this is certainly a matter where we have enough choices.

It seems to me that we can take care of the military without destroying any major segment or doing major harm to the civilian community, in particular with reference to people, the protection of people, human beings, not only physical protection but their peace of mind.

I want to know first now, and I had understood, and certainly the members of committee had always given a green light to the idea of sufficiency for the military, but I thought that you had already been given a free rein more or less and had about completed your plans so far as legislation and all was concerned for the military.

Frankly, I don't want to be confronted with a situation in my State of Mississippi concerning a site by someone saying well, we have got to have this for the military, unless it is absolutely essential. We want to be confronted with these issues now rather than a few years later.

So, the military, are they taken care of now in your plans independent, and I will just be specific, independent of any site in Mississippi that is being considered?

SELECTION OF STORAGE SITES

Mr. DAVIS. Well, so far as the permanent disposal of the solidified wastes is concerned, this is the program that we are working on today to try to identify and then to explore and finally decide on one or more respositories for the ultimate disposal of the spent waste. Those sites and that work have not so far been done.

The military program so far has been aimed at taking the wastes themselves from the tanks, converting that waste plus new waste to solid form and storing that on an interim basis until the final respositories, whether they are the same for the civilian or military or different, are finally identified and put into operation. That selection process is just now getting underway and it really is applicable to both kinds of wastes.

Senator STENNIS. So the answer is that this site in Mississippi or any others similar to it that is being considered for commercial waste, your answer is that it is also being considered for military waste? That is the way I understand your answer.

Mr. DAVIS. We are seeking to find the sites for the permanent storage of the waste and those sites could conceivably be, say, one for military and one for civilian or one which would combine them or several. That is part of the process we are going to be some time in really completing and deciding where those appropriate sites are.

Senator STENNIS. Well, for the sake of the people, and again I will put it on that basis, can you work out a plan here that would take care of the military, and take care of the military, period, and that would be it, and then take care of the commercial, the needs for the commercial waste?

I believe your proposed language is that the commercial sites can be used by the military but the military sites cannot be used for commercial waste.

Mr. DAVIS. No, I don't think——

Senator STENNIS. You haven't gone that far yet?

Mr. DAVIS. No. I think we would prefer to leave the question of the use of the ultimate sites until such time as we know more about the schedule we are on, the locations of those sites and those locations relative to the production programs and the civilian programs. There is just a great deal of information that is yet to be developed in the physical sense of where these sites might be and what the various arrangements might be for using them optimally.

Senator STENNIS. Well, I have been around long enough to know that if you leave this matter open, now, that for any site that you try to settle on and get legislation to settle it, and claim that the site is required for the military, this claim would give the site a running start and it would be mighty, mighty hard to come back or defeat or get it considered at the last minute even on an impartial basis.

I have no grievance about anything that has happened, although without the Department of Energy saying anything to me about it. You have gone down there and set up a big operation and some of your people are very attractive people. I found out later that they were telling the local people that some kind of blessed event was about to happen to them. [Laughter.]

They were going to be chosen for the future and be right up on the front seat of benefits. It was about that time that I came into the picture and had to tell them to take the other side, but I have no grievances, and I say some of those people were attractive enough. They worked their way into the civic clubs and everything and did a good job of it. [Laughter.]

That is not said in fun either because there was evidence there of a selling job. But this is more serious than that. I come back to the idea of people. I am not trying to discriminate against any, but there is just a lot of difference in taking over an area of the country where there is, say, an average of 1 person per square mile and taking over an area where there are 10 or 15 or something like that. You wouldn't think about coming down here in the middle of any city and go to setting up one of these waste disposal operations. After all, you are giving some consideration to population.

ALTERNATIVE SITES

Now until there has been an exhaustive consideration of these possible sites, it seems to me like you just can't with logic, compelling logic just pick one where so many people are being affected.

What is your answer now?

Mr. DAVIS. Let me point out that under the present legislation any final repository does have to be licensed by the Nuclear Regu-

latory Commission and they will take these factors certainly into account. So I think you can rely at least to that extent that the NRC will be going through a licensing action.

Senator STENNIS. Well, excuse me now. If you are not going to take that into account, just population, how do you expect them to take it into account?

Mr. DAVIS. Well, we will certainly take it into account when we get prepared to go to them for a license, sir.

Mr. ROSER. Senator Stennis, I would like to make a point, if I might, sir. I think the crux of the matter is, so far as the defense or the military wastes are concerned, that that waste, if we proceed with our present plans, will be solidified and in canisters and it can be stored on site at Savannah River for an indefinite period of time.

I think the point is that we do not see a pressing need for a final waste repository for the military wastes at this time.

Senator STENNIS. Well, I understand that clearly, and I want you to have what you need, but I won't want to be met with the proposition that you are going to take this site in Mississippi because of military needs.

Mr. ROSER. I understand.

Senator STENNIS. And I don't think it is necessary to have to submit to that kind of a test. You have all the facilities you need now for the military, as I understand you, and I'm calling on you to make such further provisions as you may think necessary before you go to taking these people's homes and everything they have and cast them out to luck and chance even if you do pay them some money. It is serious business.

I don't believe we will get any more sympathy or natural considerations out of the Nuclear Regulatory Commission than we will you. This legislation is coming up and once it has passed, why it is "goodbye Katy" then, if it is broad enough to include what you people want.

Mr. Chairman, if you would permit me to file some additional questions to be answered for the record.

Senator WARNER. Without objection, Mr. Chairman.

Senator STENNIS. That would be your purpose, gentlemen, to answer these questions, right?

Mr. DAVIS. We would be delighted to, sir.

Senator STENNIS. All right. Thank you very much.

Senator WARNER. Thank you, Senator Stennis.

Senator STENNIS. Thank you.

Senator WARNER. We will now turn to the ranking minority member of this subcommittee, the distinguished Senator from Washington.

Senator JACKSON. Thank you, Mr. Chairman.

Mr. Secretary, as you know, the fiscal year 1982 DOE authorization for national security activities requires a Presidential report by July 1, 1983, on the disposal of defense wastes. That is the crux of this whole business.

What is the current status of implementation of this requirement of law?

PRESIDENTIAL REPORT ON DISPOSAL OF DEFENSE WASTES

Mr. DAVIS. Our intention certainly is to complete that report and to submit it. I guess I would have to ask my associates as to the details of actually preparing the report.

Mr. ROSER. Preparation of the report has started, Senator Jackson. There are parts of it, of course, that will wait coming events, but we fully intend to meet that statutory requirement.

Senator JACKSON. The date of July 1, 1983.

Mr. ROSER. Yes, sir.

Senator JACKSON. Has there been a formal communication from the White House to the Department regarding your responsibility for this report? Are there guidelines? Has there been any indication as to the parameters of this effort from the White House?

Mr. DAVIS. Not to my knowledge, Senator.

Senator JACKSON. Well, let me ask you this. What is the Department's role defined to be for this report?

Mr. ROSER. I don't think that has been fully defined, Senator Jackson, in the absence of some clear direction from the White House.

Senator JACKSON. But shouldn't you have that? I mean you can not just go helter skelter. A lot of things go that way in this town. [Laughter.]

Mr. ROSER. We are developing all of the data that we believe we need to fulfill the requirements of the report, but I certainly agree that there needs to be some clear-cut direction from the White House outlining the responsibilities of the Department.

Senator JACKSON. Is there a staff person in the White House assigned to this particular responsibility?

Mr. ROSER. I am not aware of it if there is, Senator.

Mr. DAVIS. I think the normal course of events, Senator Jackson, would be for us to do some preliminary work and then to approach the White House and get their reaction to it.

Senator JACKSON. That is where you are now. You are the action agency at this point.

Mr. DAVIS. Yes, sir.

Senator JACKSON. But the White House role has not been put together at this particular level.

Mr. ROSER. As you mentioned, Senator Jackson, that was a part of the Department of Energy's authorization bill.

Senator JACKSON. That is my amendment.

Mr. ROSER. Yes, sir. We must presume that will be our action so we are preparing it.

Senator JACKSON. Of course, it is the Presidential report, you know, that is required. That is why I am trying to find out just where we are in connection with this requirement because the White House has to be involved.

INVOLVEMENT OF OTHER AGENCIES

What other agencies are involved? Is it just DOE?

Mr. ROSER. At the moment.

Senator JACKSON. Well, I assume you are going to be bringing in some others.

Mr. DAVIS. I assume DOD and others would be involved, sir.

Senator JACKSON. Am I fair in assuming that the report will include proposed legislation to address this problem of defense wastes?

Mr. ROSER. If it hasn't been otherwise addressed before that report is rendered, yes, Senator, it will.

Senator JACKSON. You may have some recommendations up before the time of the report?

Senator WARNER. Would the Senator yield? We haven't had a chance, you and I, to speak. I think there is some merit for our considering introducing a nuclear waste bill at the time the Senate takes up S. 1662. Of course, that bill would come back to the committee for consideration. We would do this to indicate our good faith in trying to put a legislative framework together on the defense nuclear waste issue and in that way to persuade the Senate to eliminate from S. 1662 the various defense provisions which have been discussed earlier.

Senator JACKSON. Well, we will have a chance to go over that whole question.

Senator WARNER. We will have a chance to go over that together.

Senator JACKSON. I wanted to ask, does the fiscal year 1983 proposed budget for defense waste reflect the necessary funding to move toward the level of effort necessary to implement that disposal plan which the report will contain? In other words, I assume there will be some requirement for funding for preconceptual design and possible conceptual design work to provide the cost estimates and schedules for facilities for preparation for disposal of defense waste.

FUNDS FOR DEFENSE WASTE

Mr. ROSER. The 1983 budget request does contain funds for facilities for the final solidification of defense waste. It also contains funds, Senator, for experimentation with the geologic disposal of high-level waste. So I think in answer to your question, yes, sir, it is in there.

Senator JACKSON. Well, there has to be a national plan that affects every State?

Mr. ROSER. I am sorry, Senator, I don't know what the reference is.

Senator JACKSON. Well, the report, of course, in the amendment that we referred to requires when it is submitted that there be a national plan, right?

Mr. ROSER. Yes, I think that is right, Senator. It is for a national plan, but I don't know that there is any necessity in that to address each State.

Senator JACKSON. I think you will find that it does require State-by-State reports.

Mr. ROSER. You are absolutely correct. That is right.

Senator JACKSON. Where are you in that particular category?

Mr. ROSER. The effort is just getting underway.

Senator JACKSON. You are 14 months away from July 1.

Mr. ROSER. Yes, sir, but it takes time to do those things. We have started addressing this, but we have no finished product.

Senator WARNER. Senator Jackson, I think that is a very appropriate question. Perhaps at this time we should put in the record Public Law 97-90.

Senator JACKSON. Right, so they have it.

[Public Law 97-90 follows:]

[Public Law 97-90—Dec. 4, 1981]

PLAN FOR THE PERMANENT DISPOSAL OF WASTE FROM ATOMIC ENERGY DEFENSE ACTIVITIES

SEC. 213. (a) The President shall submit to the Committees on Armed Services of the Senate and of the House of Representatives not later than June 30, 1983, a report which sets forth his plans for the permanent disposal of high-level and transuranic wastes resulting from atomic energy defense activities.

(b) Such report shall include, but not be limited to, for each State in which such wastes are stored in interim storage facilities on the date of enactment of this Act—

(1) specific estimates of amounts planned for expenditure in each of the next five fiscal years to achieve the permanent disposal of such wastes and general estimates of amounts planned for expenditure in fiscal years thereafter to achieve such purpose; and

(2) a thorough and detailed program management plan for the disposal of such wastes, including but not limited to—

(A) an explicit schedule for decisions regarding the further processing and permanent disposal of such wastes;

(B) a general description of new facilities likely to be required to achieve such permanent disposal; and

(C) identification of all major program objectives, milestones, key events, and critical path items.

Senator WARNER. Senator Hart?

Senator HART. Mr. Chairman, I have two brief questions, if I might. I think they are simply answered.

Senator WARNER. Surely, I have detailed questions and I wish to accommodate the schedules of the other members.

Senator JACKSON. I may have some questions, too, Mr. Chairman, that I will want to submit.

Senator WARNER. I will continue with questions later. Proceed, Senator Hart.

Senator HART. One of these I think the Senator from Washington might have an interest in. There have been reports, Mr. Secretary, that DOE plans to purchase the Washington Public Power Supply System No. 4 reactor to produce plutonium for weapons. Is that under consideration, and when might that occur, if that is so?

NO PLANS FOR USE OF WPPS SYSTEM

Mr. DAVIS. Well, let me say there are no plans to take such action. We are looking at a variety of possibilities and this is one that we are looking at purely as a study action at the present time.

Senator HART. Is that "looking at" far enough along to determine what the cost might be, including refitting?

Mr. DAVIS. As far as I know, it just started very recently.

Senator HART. But you are considering it or looking at it?

Mr. DAVIS. Purely as a study.

Senator HART. Also, do you have any plans to use the waste isolation pilot plant in New Mexico as a permanent repository for high-level defense waste?

NO PLANS FOR PERMANENT REPOSITORY

Mr. DAVIS. There are no plans to use it as a permanent repository for any high-level waste, but it would be retrievable and would be retrieved.

Mr. ROSER. It is strictly for experimentation with high-level waste, Senator Hart.

Senator HART. But not a permanent repository.

Mr. ROSER. There are no plans for permanent storage of high-level waste.

Senator HART. Thank you, Mr. Chairman.

Senator WARNER. Are there any further questions from other subcommittee members?

[No response.]

Senator WARNER. If not, I will proceed.

At one time it was proposed to merge the defense and commercial nuclear waste programs. Is there any change of thinking on your part now? Should these programs be merged?

MERGING OF DEFENSE AND COMMERCIAL WASTE PROGRAMS

Mr. DAVIS. No, sir, I don't believe they should. As a practical matter, it is hard to see what merging them really would amount to because they are parallel programs in different places dealing with different wastes and we certainly would not see any virtue to this at all.

Senator WARNER. What is your position on the issue of NRC licensing of a repository for defense nuclear waste?

NRC LICENSING

Mr. DAVIS. Well, in terms of the final repository, I believe this is already a matter of law.

Senator WARNER. In your view, does it make sense to include defense waste provisions in S. 1662, or would you be better off if S. 1662 dealt only with commercial waste? You have pretty well answered that.

Mr. DAVIS. I think we agree that S. 1662 should pertain only to commercial waste.

Senator WARNER. I think you were clear on that. Let's talk about some different aspects.

I ask this question because the utility companies seem to feel that S. 1662 should not be encumbered with defense waste provisions and that defense waste is better dealt with separately.

You might give me an elaboration of your position in terms of, first, program management, second, political acceptability and, third, public perception.

PROGRAM MANAGEMENT

Mr. DAVIS. Well, certainly the program management in detail on the two programs is quite separate. The defense program carries out the defense program and the nuclear energy program carries out the other. There is no practical way really to combine them in terms of the actual operations themselves.

POLITICAL ACCEPTABILITY

In terms of the political acceptability, it seems to me again that to deal with them separately is certainly the far easier thing to do from both the public and the political point of view. I think the only issue that still remains is what one might do in terms of the permanent repository in the end, and I think we have discussed that and simply pointed out that at this stage it doesn't seem a wise idea to try for a binding decision on that point.

Senator WARNER. Concerning the public perception, there are some advantages, in my judgment. Do you concur in that?

PUBLIC PERCEPTION

Mr. DAVIS. Well, as to the public perception, again I think there is not any reason for considering combining them, although I would like to say that I think our ability to immobilize the defense waste, which we do have as a practical problem to deal with, and to put those into interim storage safely, is something which I would think would be very valuable from the public perception of our ability to deal with high-level radioactive waste.

So I think anything that facilitates the military program proceeding as expeditiously as possible, which I think is one of the attributes in keeping it separate, I think in the end will actually help the public perception as it relates to the whole waste disposal program.

Senator WARNER. Turning to section 202(b), this section in both bill versions requires that the provisions of title VII relating to States' rights would apply to any repository or retrievable, monitored storage facility for defense wastes.

Would you care to elaborate why you oppose these provisions?

OPPOSITION TO PROVISIONS OF TITLE VII

Mr. DAVIS. The difficulty there is that the defense wastes basically are really a part of our overall production problem. We have the wastes in large volume and we are continuing to accumulate them and we feel it is urgent to get on with the program of converting them to solids or otherwise immobilizing them and storing them.

The whole process of trying to deal with this in the sense of the interaction with the States and the local agencies and Indian tribes seems to us to propose a very high potential for delays which may be very unacceptable to the military program.

Senator WARNER. Briefly review the State "cooperation and consultation" provisions that apply to the waste isolation pilot plant, the WIPP project, and tell us how these procedures are working.

WIPP PROJECT

Mr. DAVIS. I would like to have Mr. Roser address that.

Mr. ROSER. Actually, Senator, I think that the legislative requirement for those expired before we were able to actually to come up with an agreement with the State of New Mexico, but I was involved in negotiating that agreement and I think that I can report to you that it is working very well. As a matter of fact, I talked to Governor King just a few days ago. I had the group in from New

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Mexico the day before yesterday reporting to me on their progress on the planning for the waste isolation pilot plant.

That agreement was really arrived at on a good-faith, voluntary basis and I can report to you that we have very good relationships with the State of New Mexico in proceeding as we are currently proceeding on the waste isolation pilot plant.

Senator WARNER. Have you been able to develop any basic knowledge yet that would indicate the desirability of making this a permanent means of storage?

Mr. DAVIS. No, we have not, Mr. Chairman. I think, however, that we may have such data available as soon as we can get on with the experimentation with high-level waste and start with the emplacement of transuranic waste as well. We are, therefore, pushing to try to complete the site preliminary design validation work and get on with the construction of the repository, because we believe that the sooner we get it completed the sooner we can develop empirical data that would indicate the suitability of not only the bedded salt medium but perhaps even that site for long-term permanent storage.

Although there are no plans for that, as I mentioned to Senator Hart, to use it as a long-term permanent storage, we believe that it is very important that we demonstrate empirically that that can be done.

Senator WARNER. In connection with the States' rights question, do you think that those are applicable, based on your experience, to the long-term solution?

Mr. ROSER. As far as I am concerned, Mr. Chairman, I think the States should have a voice in the development of a long-term waste repository. One of the problems we faced in dealing with the State of New Mexico was some indication that New Mexico would have a veto right.

Personally I think this is a matter of national concern and I do not think that a State should have a veto right. On the other hand, I think that it is imperative that in the development of any repository that we work very closely with the State and be in a position to assure the State that the concerns of the citizens of the area have been adequately addressed and that when the facility, whatever it may be, is completed that their safety or well-being will not be affected.

Senator WARNER. Do you have any plans at this time, Mr. Secretary, to store defense wastes in any form in a commercial repository?

STORAGE OF DEFENSE WASTE IN COMMERCIAL REPOSITORY

Mr. DAVIS. Well, as I have said, we don't have any plans to either store or not to store it. That is a decision we feel should be made in the future, depending on the circumstances.

Senator WARNER. In your planning for a commercial repository, will you include the option to handle defense wastes?

Mr. DAVIS. Certainly any repository that I can visualize would have a capability of handling probably a range of characteristics of waste, and generally defense wastes, at least for the present time and the foreseeable future, will be easier to store in several re-

spects than commercial wastes. So that I would say that almost by definition that a repository, regardless of its purpose, would handle a wide variety of wastes and certainly could include defense waste as well as commercial waste.

Senator WARNER. So this would not complicate your planning because of the different characteristics of waste?

Mr. DAVIS. The only problem that arises there really would be the question of the fees. If the commercial repositories are financed from the assessment against nuclear-produced power, then presumably there would have to be some provision for charging a fee for the storage of the defense waste, but I think this is primarily an administrative problem and not a technical problem.

Senator WARNER. Section 203 in the Environment and Public Works version of the bill adds a new subsection to the Atomic Energy Act that would preclude the use of commercial spent fuel for defense purposes.

We will put in the record at this point the language from the joint report that expresses the position of the committee.

d. The committee also added a new general provision, section 203, that would prohibit the transfer, reprocessing or use of spent fuel from commercial nuclearpower plants for nuclear explosive purposes. The committee believes that the use of commercial spent fuel for nuclear explosive purposes would seriously jeopardize the nonproliferation objectives of this country and would undermine the credibility necessary for the United States to influence other nations to commit and adhere to the international nonproliferation requirements and safeguards. In addition, the committee believes that a program for the use of commercial spent fuel for weapons purposes would impose an inappropriate burden on the commercial nuclear power program in this country by tending to eliminate the historical distinction between the military and peaceful uses of nuclear energy. For these reasons, the committee recommends the prohibition contained in section 203.

Have you read that language?

Mr. DAVIS. Yes, sir.

Senator WARNER. You have made clear that there are currently no plans to use commercial spent fuel for defense purposes and that you oppose this provision. I would like to have a restatement of your reasons for opposition.

OPPOSITION TO SECTION 203

Mr. DAVIS. Basically we feel, although we have no plans at the present time, that we can't foresee the future well enough to be able to assert that there might not arise at some future time an urgent need to make use of these facilities or of commercial fuels for use in the military program and we would not like to see us foreclosed by law from doing this, particularly when the other countries who are in the same position have, as we have so far, reserved the right to do this if it is needed for national security. So our strong position is we do not think this is an appropriate section for the bill.

Senator WARNER. I assume you are speaking for the administration in opposing this provision. Nevertheless, we would like to have an indication in the record of whether or not you have consulted with the Department of State and the Arms Control and Disarmament Agency.

Mr. DAVIS. Our position has been approved, I think, by the White House and I think it can be taken as an administration position.

Senator WARNER. So that indicates a coordinated policy decision?

Mr. DAVIS. They said it has been coordinated with State as well as with the White House.

INTERNATIONAL AGREEMENT AND PROLIFERATION

Senator WARNER. Let's address the concerns of the Environment and Public Works Committee.

Their first concern is with the U.S. credibility in the international nuclear community. Are we now prohibited by any international agreement from using commercial spent fuel for defense purposes?

Mr. DAVIS. No, sir.

Senator WARNER. Do you think that the use of commercial spent fuel for defense purposes would seriously jeopardize the nuclear proliferation objectives of this country?

Mr. DAVIS. No; I don't believe it would be a significant factor at all, sir.

Senator WARNER. Can you provide for the record here the nations that are signatories to the Nuclear Nonproliferation Treaty?

Mr. DAVIS. Yes, sir, we can do that. It is quite a long list.

[The information follows:]

NON-NUCLEAR-WEAPONS STATES PARTY TO NUCLEAR NONPROLIFERATION TREATY

1. Afghanistan
2. Australia
3. Austria
4. Bahamas
5. Bangladesh
6. Barbados
7. Belgium
8. Benin
9. Bolivia
10. Botswana
11. Bulgaria
12. Burundi
13. Canada
14. Central African Republic
15. Chad
16. Congo
17. Costa Rica
18. Cyprus
19. Czechoslovakia
20. Democratic Kampuchea
21. Democratic Yemen
22. Denmark
23. Dominican Republic
24. Ecuador
25. Egypt
26. El Salvador
27. Ethiopia
28. Fuji
29. Finland
30. Gabon
31. Gambia
32. German Democratic Republic
33. Germany, Federal Republic of
34. Ghana
35. Greece
36. Grenada
37. Guatemala
38. Gunneo Bissaw
39. Haiti
40. Holy See
41. Honduras
42. Hungary
43. Iceland
44. Indonesia
45. Iran
46. Iraq
47. Ireland
48. Italy
49. Ivory Coast
50. Jamaica
51. Japan
52. Jordan
53. Kenya
54. Korea
55. Lao People's Democratic Republic
56. Lebanon
57. Lesotho
58. Liberia
59. Libyan Arab Jamahiriya
60. Liechtenstein
61. Luxembourg
62. Madagascar
63. Malaysia
64. Maldives
65. Mali
66. Malta
67. Mauritius
68. Mexico
69. Mongolia
70. Morocco
71. Nepal
72. Netherlands
73. New Zealand
74. Nicaragua
75. Nigeria
76. Norway
77. Panama
78. Paraguay

79. Peru
80. Philippines
81. Poland
82. Portugal
83. Romania
84. Rwanda
85. St. Lucia
86. Samoa
87. San Marino
88. Senegal
89. Sierra Leone
90. Singapore
91. Somalia
92. Sri Lanka
93. Sudan
94. Suriname
95. Swaziland
96. Sweden
97. Switzerland
98. Syrian Arab Republic
99. Thailand
100. Togo
101. Tonga
102. Tunisia
103. Turkey
104. Tuvala
105. United Republic of Cameroon
106. Upper Volta
107. Uruguay
108. Venezuela
109. Yugoslavia
110. Zaire
111. Taiwan
112. Cape Verde
113. Papua New Guinea

NUCLEAR WEAPONS STATES PARTY TO NUCLEAR NONPROLIFERATION TREATY

1. Union of Soviet Socialist Republics
2. United Kingdom
3. United States

Senator WARNER. Does the NPT require that civilian and defense programs be kept separate?

REQUIREMENTS OF THE NPT

Mr. DAVIS. Well, the NPT basically deals with countries who do not have defense nuclear programs. It is an agreement which is in a sense sponsored by the nuclear weapons states for the benefit of the nonnuclear states and the intention is really that they not have defense nuclear programs.

Senator WARNER. Does not the NPT require that civilian and defense programs be kept separate?

Mr. DAVIS. Well, the intent of it is that really there is a prohibition against in effect their having a military nuclear program. The essence of the NPT, the nonproliferation treaty, is that in exchange for foregoing having military nuclear programs that the weapons states will make available to them information, equipment, fuel, and other things to facilitate their civilian nuclear programs.

Senator WARNER. I am familiar with the treaty, but I am just asking the question. Do you interpret it as requiring that the civilian and defense programs be kept separate?

Mr. DAVIS. What I am really saying is that it is aimed at not only keeping them separate, but it is aimed at their not having them. So I guess you could interpret it as being kept separate.

Senator WARNER. It has been brought to my attention by my staff that the United States, the United Kingdom, and others that have dual programs are signatories. The question is, Do you interpret the treaty as requiring those nations that do have the dual programs to keep them separate?

SEPARATE WASTE PROGRAMS

Mr. DAVIS. Well, to the extent that the weapons states, which are a different category there, there is no requirement. In fact, quite the opposite.

Senator WARNER. Of those countries that signed the NPT, how many keep their commercial and defense nuclear programs separate?

Mr. DAVIS. Again, we are getting into this little problem between the weapons states who are one class, let's say, of signatories to the NPT, and the nonweapon states. The agreement with the nonweapon states is that they in effect will forego a nuclear weapons program.

As far as the weapons states, which is a different category, which of course is Russia, the United Kingdom, and the United States, there are no obligations in any of these, as I think I mentioned earlier, to keep their programs separate. I believe that in many cases they have kept them separate.

Senator WARNER. You say in many cases. Do you know of any case where they have not?

Mr. DAVIS. I think with respect to countries like Russia I would be rather skeptical, but I don't have any data I can quote in the open.

Senator WARNER. I think it is important that we develop for the record information on those weapons states that do commingle commercial and defense wastes, and I think we have strong reason to believe that the Soviet Union does that.

Mr. DAVIS. Oh, I certainly share that conviction, yes, sir.

Mr. ROSER. I think, Senator, the only indication we really have of a country that does try to keep them separate is the United Kingdom.

Senator WARNER. And the United States.

Mr. ROSER. And the United States

Senator WARNER. So of the category of the states that have the dual system, it is only the United States and the United Kingdom that have a clear case of separability.

Mr. ROSER. I think that is correct, yes, sir.

REPROCESSING SPENT COMMERCIAL FUEL

Senator WARNER. Isn't this issue somewhat parallel to the reprocessing question? The United States adopted a policy in 1977 that they would not reprocess spent commercial fuel because reprocessing technology might have adverse proliferation implications. That decision has simply driven other nations, for example, the French and the Japanese, to accelerate their own reprocessing capability. Couldn't this provision further stifle any hope that the United States might start reprocessing to recover the energy potential that now exists in commercial spent fuel?

Mr. DAVIS. I guess I am not quite sure of the intent of that question, sir.

Senator WARNER. Why don't you submit your answer for the record.

[The information follows:]

We see no relationship between the provision for prohibition on use of civilian reactor fuel for defense nuclear weapons and the stifling of commercial reprocessing hopes to recover the energy potential that exists in spent fuel. The objective of commercial reprocessing is to recover the valuable unburned uranium and plutonium for reuse in fueling reactors. This is distinctly different from the national security basis for acquiring weapons-grade plutonium. The administration is optimistic that

the private sector will develop commercial reprocessing services which will recover this valuable energy resource.

Senator WARNER. I will defer to Chairman Stennis.

Senator STENNIS. Well, Mr. Chairman, I certainly thank you and I want to thank you for all of your courtesies in these hearings that you are holding.

Doctor, you and your associates, I am totally in sympathy with you and this problem, but I don't understand from any of you just why the time rush as reflected in this bill. Now you are shooting for 1,000 years of service from whatever you select, I am sure. If you people are called on to make such decisions, are you sure that the time limits of the bill gives you sufficient time to make a real thorough and exhaustive study and consideration of this matter of such magnitude and make a decision, or don't you feel you need more time after all?

TIME TO IMPLEMENT PROGRAM

Mr. DAVIS. No, sir. There has been active development work and planning underway for the disposal of high-level radioactive waste for something in the order of 30 years. There has been a great emphasis on studies and we feel it is time now to try to move ahead and to actually implement a program. With the time elements that are set forth, we think that we are in good shape to proceed on that schedule.

Senator STENNIS. Well, 30 years ago, it certainly didn't start down our way then. This is an awfully serious matter looking at it from the viewpoint of the people that live there in the area or in any State. There will be a real fight over these matters and it won't be easily handled.

I just, with all deference to you, and I know you feel like you want to do a thorough job, but I just believe you might be pushed some timewise with regard to this selection now.

I want to thank you for answering these other questions here. You are going to condense them as much as you can for your time is worth something, but this is a very grave matter.

Mr. Chairman, I thank you again.

Mr. Chairman, I appreciate your courtesy to these people that have come from the University of Mississippi, the Bureau of Governmental Research there. May I ask them to stand and introduce them at this time to the committee's record.

Dr. Robert E. MacArthur who is director of our governmental research there at the University of Mississippi and he is accompanied by Mr. Danna B. Brammer, associate director. Will you stand, Mr. Brammer?

I am delighted these gentlemen could be with us.

I thank you again.

Senator WARNER. Thank you, Mr. Chairman.

The Environment and Public Works report states in part, and I quote:

* * * use of commercial spent fuel for weapons purposes would impose an inappropriate burden on the commercial nuclear power programs in this country by tending to eliminate the historical distinction between the military and peaceful uses of nuclear energy.

Please comment.

Mr. DAVIS. Well, I think to a certain extent if it were carried, it would confuse somewhat the basic economics and some of those considerations in terms of the operation of commercial power reactors. I think this is one of the reasons that we certainly would not plan to do this except under some kind of emergency conditions.

Senator WARNER. How much usable weapons grade plutonium exists today in commercial spent fuel and how fast is it being accumulated?

Mr. DAVIS. Well, in terms of the actual amount of plutonium that exists in the discharged fuel in the country today there is something I believe on the order of 60 tons of plutonium. Most of that is not usable in our weapons program as it exists today. Some of it could be used to make devices of one sort or another, but in terms of its being usable in our own weapons program, it simply would not be usable without further refinement.

Now there is a small amount that has only been irradiated a short time and conceivably might be used. But basically the bulk of it is simply not usable in our own program today.

The second part of the question as to how fast is it being accumulated, and it is about 20 tons per year.

Senator WARNER. The next question for the record. List the other useful isotopes, their potential use, their quantity and their rate of accumulation that exists in commercial spent fuel.

ISOTOPES IN COMMERCIAL SPENT FUEL

Mr. DAVIS. Mr. Chairman, that is rather a long list.

Senator WARNER. We are going to ask you to respond for the record.

Mr. DAVIS. We have one and if we can supply it for the record I would prefer to.

[The information follows:]

In addition to plutonium-239, the following list of useful isotopes and their potential use, quantity, and annual rate has been estimated by the year 2000 assuming installed civilian nuclear capacity of 400 GWe:

Isotope	Potential use	Quantity (grams)	Annual rate (grams)
Stable krypton	Electric light bulbs	2.5×10^{7}	1.3×10^{4}
Stable xenon	Anesthesia	3.6×10^{8}	1.9×20^{20}
Stable palladium	Catalyst used in oil refining	6.0×10^{7}	4.2×10^{6}
Stable ruthenium	do	1.6×10^{8}	8.4×10^{6}
Krypton-85	Self-luminous airfield lights, nondestructive testing of jet engine blades.	1.3×10^{8}	1.0×10^{4}
Stronium-90	Heat sources for radioisotopic thermoelectric generators	3.4×10^{7}	3.3×10^{6}
Cesium-137	Sterilization food, sludge, medical supplies	1.4×10^{8}	1.0×10^{7}
Promethium-147	Self-luminous lights	2.7×10^{6}	5.3×10^{5}
Technetium-99	Corrosion resistant additive to steel	4.7×10^{7}	2.9×10^{6}
Ruthenium-106	Catalyst in closed systems	1.3×10^{8}	8.4×10^{6}
Rhodium-103	do	2.6×10^{7}	1.6×10^{6}
Neptunium-237	Feed for producing plutonium-238	2.5×10^{7}	1.6×10^{6}
Plutonium-238	Heat sources for space RTG	8.5×10^{5}	1.4×10^{4}
Curium-244	Heat sources for RTG	9.0×10^{5}	9.4×10^{4}
Americium-241	Smoke detectors	3.2×10^{7}	9.4×10^{4}

It is impossible to quantify a value for any of these isotopes without a detail study of their potential application. However, one can assume in the case of the noble metals, they would have a value equal to that paid for the naturally occurring species. For example, the current price of rhodium is approximately $22.50 per gram.

Senator WARNER. The administration has said it wants to begin reprocessing spent commercial fuel. The details as to how that would be done remain to be worked out. If you do begin reprocessing, what will you do with the plutonium that is extracted?

USE OF PLUTONIUM FROM REPROCESSING

Mr. DAVIS. Well, basically we would use the plutonium for, first of all, providing fuel for the fast flux test facility which is a breeder research facility in Washington. We would save a substantial amount for use in the Clinch River breeder reactor and possible future breeders. There is also a significant requirement for plutonium for use in zero power reactors in other experimental facilities. So that we would certainly be utilizing the plutonium for our own development program, primarily that associated with breeders.

Senator WARNER. What about the quantity? Can you use it all or are you going to have some left over?

Mr. DAVIS. Ultimately we certainly will have to go back to considerations either as to how fast the breeder reactors will actually come into use or we will have to go back and consider at some point the recycle of plutonium in light water reactors as a part of their fuel.

Senator WARNER. Let's discuss the economic implications of this provision. Assuming that you don't use commercial spent fuel for plutonium, what is it going to cost to get needed plutonium from military only sources?

Mr. DAVIS. I would prefer not to answer that question at this hearing, sir.

Senator WARNER. You will provide it in executive session, though, sir.

Mr. DAVIS. Yes, sir.

Senator WARNER. Wouldn't this necessitate building one or more new reactors? I assume there is a cost involved there.

Mr. DAVIS. We are examining again the question as to how to meet the requirements we now have for military plutonium and in all probability this will require the construction of new reactors. However, these will not, of course, have much impact over the next 10 years or so.

Senator WARNER. Assuming that you do use commercial spent fuel for plutonium, how much will that cost?

Mr. DAVIS. We have made some very preliminary kinds of estimates. We haven't really considered it sufficiently seriously to have good numbers. The process that would be utilized to refine the plutonium so that it could be used is still under development and we don't know today precisely what the capital or operating costs would be. It is likely just as a general proposition that it might cost less than getting it strictly from a new reactor built for military purposes. But I would rather defer on any specific costs at this time.

Senator WARNER. In general would you agree that it is cheaper to get plutonium from commercial fuel?

Mr. DAVIS. In our view it probably would be, yes, sir.

Senator WARNER. That is an important consideration.

Title VIII of the bill, as reported by the Environment and Public Works Committee, requires a study of defense wastes. This provision is similar to a provision authorized by Senator Jackson, and included in last year's act authorizing DOE defense programs.

I am referring specifically to section 213 of the Public Law 97-90 signed by the President on December 4, 1981, and a copy of that provision has been previously included in the hearing record. Mr. Secretary, what is your position on title VIII as it appears in S. 1662?

DEFENSE WASTE IN A COMMERCIAL REPOSITORY

Mr. DAVIS. Well, this again goes back to the question of duplicate or parallel reports with a different time scale. I think our view is that we would cover in the report required by Public Law 97-90, which is due in July of next year all of those matters which are required by that section of S. 1662, and we would prefer to go in that way.

Senator WARNER. Subsection 801(c) directs the President to consider using a commercial repository for defense waste. It is interesting to note that this is in direct contradiction to the subsection 202(c) of the Energy Committee version which prohibits placing defense waste in a commercial repository. In doing the study required by Public Law 97-90 would you consider the option to put defense waste in a commerical repository?

Mr. DAVIS. Yes, sir. We certainly think that this is a reasonable option to examine. Again, as I have said, it depends on locations, on time scales and variety of factors which we cannot ascertain at the present time, but we feel it is a reasonable option to consider.

Senator WARNER. Considering the pace of the defense nuclear waste program versus the commercial program, and I think you earlier indicated that defense is somewhat ahead, isn't it more likely that there will be a defense repository long before there is a commercial repository and that it may be appropriate to consider putting commercial waste in the defense repository?

Mr. DAVIS. Well, there is no current program in the defense program leading directly to a high level waste repository. In fact, I think our thinking has been that we are developng repositories which would be used for one or both. The present plan is to mobilize the defense wastes and to store them on an interim basis. As Mr. Roser has pointed out, this could be for a considerable period of time.

Our feeling now is that on the schedule that we are talking about for the permanent repositories that these will be provided in adequate time at one or more sites as necessary to meet the requirements of the defense program and that there is no intermediate problem in storing the waste for that period of time.

Senator WARNER. In essence, you want to leave open that option?

Mr. DAVIS. We certainly would like to leave open that option, yes, sir.

Senator WARNER. Subsection 801(d) would impose several regulatory constraints on a defense only repository. Do you see any need for such constraints?

REGULATORY CONSTRAINTS

Mr. DAVIS. Well, I think as we have said, the benefits to be derived from the extensive state and tribal involvement in siting a defense repository don't seem to offset the potential harm to our national security interests in terms of trying to deal basically with our production program and one which is classified. So that we would oppose in the interests of national security the sort of open-ended state and Indian tribe participation necessary for siting a repository used only for the disposal of defense wastes.

I think it relates back sort of to our overall plan and I think that under the concept that we are discussing of developing repositories, that before we get to that stage, but as a part of that planning process, to decide which ones might be military, which be civilian, or which might be both, that we would probably deal with that issue in that context.

Senator WARNER. Mr. Secretary, I mentioned earlier the need to address S. 1662 on the Senate floor next week. We will have to hold subcommittee and full committee markup so I am going to ask your maximum assistance in preparing this hearing record for utilization by the subcommittee, the full committee and eventually on the Senate floor.

Mr. DAVIS. Yes, sir, we would be very pleased to do that.

[Questions with answers supplied below:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

DEFENSE VERSUS COMMERCIAL WASTES

Senator WARNER. Compare the hazard levels of defense wastes versus commercial wastes. Which represents the greatest problem for long term handling?

ANSWER. The radiologic hazard of high level waste is a function of the radionuclide content and age. Commercial fuels stay in the reactor longer and are more hazardous than defense fuels because of their higher radionuclide content. As the waste ages, the hazard is reduced through decay.

Some older, low irradiation defense waste has decayed so long that it is now similar to certain TRU or low level wastes.

Senator WARNER. In your view, which program for the long term handling of nuclear waste is further along—the commercial waste program or the defense waste program?

ANSWER. The programs are parallel, mutually supportive and complementary. Waste vitrification work has been developed on behalf of both programs. The defense waste program will have a full-scale R&D pilot facility by 1989, the Waste Isolation Pilot Plant. The Defense Waste Processing Facility will be routinely immobilizing high level waste by the same time. The commercial program for a high level waste repository is well along. The defense program does not include plans for a separate high level waste repository.

MERGING WASTE PROGRAMS

Senator WARNER. At one time, it was proposed to merge the defense and commercial nuclear waste programs. Should these programs be merged? What are the pros and cons?

ANSWER. No. The wastes are separate and different. A merger would serve no useful purpose now. There are important considerations pertaining to the effective management of defense waste activities affecting nuclear weapons production and our national security that are essentially not involved in commercial waste management. These special considerations militate against a complete merger of manage-

ment of the two programs, and against outside control by a regulatory agency, such as the NRC, over any activities or facilities of the Department's Defense programs. There is essentially no advantge to merging the programs because, to the greatest extent practicable, all technological information of possible benefit to either program is being promptly exchanged, and mutual technical interchanges are being promptly effected.

Senator WARNER. What is your position on the issue of NRC licensing of a repository for defense nuclear waste?

ANSWER. DOE has no specific plans for a dedicated defense high level waste repository. The licensing of such a repository, if developed, would be covered by section 202(4) of the Energy Reorganization Act of 1974.

Senator WARNER. In your view, does it make sense to include defense waste provisions in S. 1662 or would you be better off if S. 1662 dealt only with commercial waste? I ask this question because the utility companies seem to feel that S. 1662 should not be encumbered with defense waste provisions—that defense waste is better dealt with separately. You might give me your position in terms of: program management, political acceptability, and public perception.

ANSWER. No. Both programs are being managed effectively; they are separate but parallel and mutually complementary. In this way, the commercial program is not jeopardized by getting tangled in the treatment of classified information, and the defense program does not suffer the costs, delays, and other impacts that could be associated with joint management. The management of defense wastes has traditionally met with less political and public controversy than commercial activities. Political acceptability and public perception are likely to differ significantly between the two programs due to the different sources of the wastes and the different objectives of the programs generating them.

SECTION 202(b)

Senator WARNER. Let me turn to the specific provisions in the bill that relate to defense waste. Section 202(b) in both bill versions required that the provisions of Title VII, relating to States' rights, would apply to any repository or retrievable, monitored storage facility for defense wastes. I believe you said you opposed this provision. Would you tell us why?

ANSWER. Section 202(b) requires application of the provisions of Title VII for extensive state (and as appropriate, Tribal Council) participation in the development of repositories if NRC licensing applies. In the interest of national security, the Department opposes the open-ended state and tribal participation necessary for siting a repository used only for disposal of defense waste since it provides a high potential for delays which may be very disruptive to defense programs. Nuclear weapons stockpile information could be derived from public discourse on the volume and characteristics of defense high level waste and transuranic waste, thereby disclosing sensitive information and jeopardizing national security interests. Section 202(b) would also invite disruption of national security activities by intervenors. DOE believes that environmental integrity and public health and safety can be achieved in the development of a defense waste repository with more traditional state and local involvement than Title VII would prescribe. The Department believes, however, that a policy of consultation and cooperation such as has been developed with the State of New Mexico for the WIPP facility can work.

WASTE ISOLATION PILOT PLANT

Senator WARNER. Briefly review the State "cooperation and consultation" provisions that apply to the Waste Isolation Pilot Plant (WIPP) project and tell us how these procedures are working.

ANSWER. The DOE National Security and Military Applications of Nuclear Energy Authorization Act of 1980 provides that the DOE enter into an agreement with New Mexico state officials. In July 1981, an Agreement for Consultation and Cooperation was signed between the State of New Mexico and the DOE regarding the WIPP project. The purpose of the Agreement is to designate key events and establish procedures for review of the WIPP project, including the setting of time frames for review and for resolution of conflicts between the State and DOE.

Under the Agreement, the parties agree as follows:

The DOE will consult and cooperate with the State with respect to health and safety concerns and will give consideration to such concerns.

Points of contact will be the chairman of the Task Force, a person designated by the Governor, and the Manager of DOE/Albuquerque Operations Office.

The Agreement may be modified according to future developments.

Key events and milestones are listed and defined.

Consultation and cooperation procedures are described; these give the State the right to be fully advised and to perform independent review and monitoring.

DOE shall continue to assist the State in providing for independent review.

The Agreement is binding and enforceable.

Consultation and cooperation between DOE and the State of New Mexico is working. By contrast, we oppose Section VII because it could adversely impact defense programs through delays and cost overruns.

SECTION 202(C)

Senator WARNER. Section 202(c) of the Energy Committee version precludes placing any defense wastes in repositories built for commercial waste. What is your position on this provision and why?

ANSWER. DOE is opposed to legislatively precluding placement of defense waste in a commercial repository. Defense waste is more dilute than commercial waste and should be able to meet all technical requirements for acceptance at a commercial repository. A decision now is unnecessary and should be deferred until the NRC Acceptance Criteria are defined and national security implications of meeting these criterias can be assessed.

COMMERCIAL REPOSITORY

Senator WARNER. Do you have plans at this time to store defense wastes in any form in a commercial repository?

ANSWER. Routine disposal of high level defense wastes will occur at a commercial repository if there are no adverse impacts on national security programs. A defense waste repository will be developed if it is determined that disposal in a commercial facility is not appropriate.

Senator WARNER. In your planning for a commercial repository, will you include the option to handle defense wastes? I would think that this option would complicate your planning because the characteristics of defense waste are far different from commerical waste.

ANSWER. Defense wastes are more dilute, and easier to handle than commercial wastes. A repository for commercial wastes could easily accommodate thermally and radioactively cooler defense wastes. The planning for a commercial repository should therefore not preclude the disposal of defense wastes.

Senator WARNER. Section 203 in the Environment and Public Works version of the bill adds a new subsection to the Atomic Energy Act that would preclude the use of commercial spent fuel for defense purposes. Mr. Secretary, you have stated that there are currently no plans to use commercial spent fuel for defense purposes; however, you oppose this provision. Please restate the basis of your opposition.

ANSWER. The Department of Energy is concerned that section 203 of S. 1662 is inappropriate since it would statutorily preclude use of commercial spent fuel to provide plutonium for nuclear weapons. This would unnecessarily restrict potential options that might be needed at some time in the future to meet national defense requirements in a unilaterial manner that in no way applies to other countries, in particular to our potential adversaries. It may become possible to process a small quantity of commercial spent fuel, should suitable facilities and technologies become available, to obtain weapons material more economically or sooner than by traditional means. Such facilities would require congressional approval; therefore, the provisions of section 203 are unnecessary.

Senator WARNER. I assume you are speaking for the administration in opposing this provision. Have you consulted with the State Department and the Arms Control and Disarmament Agency on this provision?

ANSWER. Yes, we have received concurrence with this position.

ENVIRONMENT AND PUBLIC WORKS COMMITTEE CONCERNS

Senator WARNER. Let's address the concerns of the Environment and Public Works Committee. Their first concern is with U.S. credibility in the international nuclear community. Are we now prohibited by an international agreement from using commercial spent fuel for defense purposes?

ANSWER. On the contrary, the United States agreement with the International Atomic Energy Agency (IAEA) provides the explicit right for the U.S. to remove safeguard requirements and shift facilities and materials to the defense sector where there is a national security need. All of the other nuclear weapons states

which have agreed to IAEA safeguards have preserved similar flexibility, e.g., France and the United Kingdom.

Senator WARNER. Do you think that the use of commercial spent fuel for defense purposes would "seriously jeopardize the non-proliferation objectives of this country?"

ANSWER. No. I am not aware of any evidence that such forebearance by a weapons state has had any significant influence on a potential proliferating country.

NUCLEAR NON-PROLIFERATION TREATY (NPT)

Senator WARNER. Review briefly the Nuclear Non-Proliferation Treaty (NPT). When was it negotiated, what nations are signators, etc?

ANSWER. The treaty is described as a fundamental agreement among nuclear weapons states and non-nuclear weapons states in which the latter have committed themselves not to acquire nuclear weapons in exchange for commitments by the nuclear weapons states to make progress in nuclear arms control and to recognize the rights of parties to use nuclear energy for peaceful purposes. It was finalized and open for signature on July 1, 1968. The list of parties to the treaty.

NON-NUCLEAR-WEAPONS STATES PARTY TO NPT [1]

1. Afghanistan
2. Australia
3. Austria
4. Bahamas
5. Bangladesh
6. Barbados
7. Belgium
8. Benin
9. Bolivia
10. Botswana
11. Bulgaria
12. Burundi
13. Canada
14. Central African Republic
15. Chad
16. Congo
17. Costa Rica
18. Cyprus
19. Czechoslovakia
20. Democratic Kampuchea
21. Democratic Yemen
22. Denmark
23. Dominican Republic
24. Ecuador
25. Egypt
26. El Salvador
27. Ethiopia
28. Fuji
29. Finland
30. Gabon
31. Gambia
32. German Democratic Republic
33. Germany, Federal Republic of
34. Ghana
35. Greece
36. Grenada
37. Guatemala
38. Gunneo Bissaw
39. Hain
40. Holy See
41. Honduras
42. Hungary
43. Iceland
44. Indonesia
45. Iran
46. Iraq
47. Ireland
48. Italy
49. Ivory Coast
50. Jamaica
51. Japan
52. Jordan
53. Kenya
54. Korea
55. Lao People's Democratic Republic
56. Lebanon
57. Lesotho
58. Liberia
59. Libyan Arab Jamahiriya
60. Liechtenstein
61. Luxembourg
62. Madagascar
63. Malaysia
64. Maldives
65. Mali
66. Malta
67. Mauritius
68. Mexico
69. Mongolia
70. Morocco
71. Nepal
72. Netherlands
73. New Zealand
74. Nicaragua
75. Nigeria
76. Norway
77. Panama
78. Paraguay
79. Peru
80. Philippines
81. Poland
82. Portugal
83. Romania
84. Rwanda
85. St. Lucia
86. Samoa
87. San Marino
88. Senegal
89. Sierra Leone
90. Singapore
91. Somalia
92. Sri Lanka
93. Sudan
94. Suriname

95. Swaziland
96. Sweden
97. Switzerland
98. Syrian Arab Republic
99. Thailand
100. Togo
101. Tonga
102. Tunisia
103. Turkey
104. Tuvala
105. United Republic of Cameroon
106. Upper Volta
107. Uruguay
108. Venezuela
109. Yugoslavia
110. Zaire
111. Taiwan
112. Cape Verde
113. Papua New Guinea

NUCLEAR WEAPONS STATES PARTY TO NPT

1. Union of Soviet Socialist Republics
2. United Kingdom
3. United States

[1] As of Mar. 22, 1982.

Senator WARNER. Does the NPT require that civilian and defense programs be kept separate?

ANSWER. No. Nuclear weapons states retain the right to shift facilities from the defense sector to the commercial sector and vice versa.

Senator WARNER. Of those countries that signed the NPT, how many keep their commercial and defense nuclear programs separate? Perhaps you could go down the list of signators and indicate in general terms how their nuclear programs operate?

ANSWER. The vast majority of the signators have no nuclear weapons capability at all and have agreed to forego nuclear weapons programs. The nuclear weapons states exclusively have the right to shift facilities from civilian to defense programs. It is believed that of the nuclear weapons states, only the United States and the United Kingdom keep the programs separate to any extent.

Senator WARNER. Isn't this issue somewhat parallel to the reprocessing question? The U.S. adopted a policy in 1977 that they would not reprocess spent commercial fuel because reprocessing technology might have adverse proliferation implications. That decision has simply driven other nations—for example, the French and the Japanese—to accelerate their own reprocessing capability. Couldn't this provision further stifle any hope that the U.S. might start reprocessing to recover the energy potential that now exists in commercial spent fuel?

ANSWER. We see little relationship between the provision for a prohibition on use of civilian reactor fuel for defense nuclear weapons and the stifling of commercial reprocessing hopes to recover the energy potential that exists in spent fuel. The objective of commercial reprocessing is to recover the valuable unburned uranium and plutonium for reuse in fueling reactors. This is distinctly different from the national security basis for acquiring plutonium for weapons use. The Administration is optimistic that the private sector will develop commercial reprocessing services which will recover this valuable energy resource.

Senator WARNER. Comment on the contention in the Environment and Public Works report that ". . . use of commercial spent fuel for weapons purposes would impose an inappropriate burden on the commercial nuclear power programs in this country by tending to eliminate the historical distinction between the military and peaceful uses of nuclear energy."

ANSWER. It would not impose an inappropriate burden on commercial nuclear power programs. It may complicate economic considerations, but that is not a significant burden. The Department has no plans to use commercial power reactor spent fuel to provide plutonium for nuclear weapons. Given the importance of maintaining a clear distinction between the peaceful and the defense uses of nuclear energy, as well as the domestic and international non-proliferation implications of such a step, such an action would be considered only if absolutely essential for national security. Moreover, such an action would have to be approved at the highest level of government, and the views of Congress would be sought and weighed in making the decision. This link between defense and commercial programs in case of national need has been national policy for decades. As the status quo, it cannot eliminate "the historic distinction between the military and peaceful use of nuclear energy," nor can it "burden" commercial nuclear power programs.

USABLE GRADE PLUTONIUM

Senator WARNER. How much usable weapons grade plutonium exists today in commercial spent fuel? How fast is it being accumulated?

ANSWER. The total amount of reactor-grade plutonium contained in the spent fuel discharged from commercial reactors, as of the end of 1981, is approximately 60 metric tons (MT). However, it is estimated that there is effectively very little weapon-grade plutonium (less than 1MT) in this spent fuel.

Reactor-grade plutonium in spent reactor fuel is being discharged at the rate of about 20MT per year.

OTHER USEFUL ISOTOPES

Senator WARNER. For the record, list the other useful isotopes, their potential use, their quantity and their rate of accumulation that exists in commercial spent fuel. Characterize in some fashion the value of these isotopes.

ANSWER. In addition to plutonium-239, the following list of useful isotopes and their potential use, quantity, and annual rate has been estimated by the year 2000 assuming installed civilian nuclear capacity of 400 GWe:

Isotope	Potential use	Quantity (grams)	Annual rate (grams)
Stable krypton	Electric light bulbs	2.5×10^{7}	1.3×10^{4}
Stable xenon	Anesthesia	3.6×10^{8}	1.9×20^{7}
Stable palladium	Catalyst used in oil refining	6.0×10^{7}	4.2×10^{6}
Stable ruthenium	....do	1.6×10^{8}	8.4×10^{6}
Krypton-85	Self-luminous airfield lights, nondestructive testing of jet engine blades.	1.3×10^{8}	1.0×10^{4}
Strontium-90	Heat sources for radioisotopic thermoelectric generators	3.4×10^{7}	3.3×10^{6}
Cesium-137	Sterilization food, sludge, medical supplies	1.4×10^{8}	1.0×10^{7}
Promethium-147	Self-luminous lights	7.7×10^{6}	5.3×10^{5}
Technetium-99	Corrosion resistent additive to steel	4.7×10^{7}	2.9×10^{6}
Ruthenium-106	Catalyst in closed systems	1.3×10^{8}	8.4×10^{6}
Rhodium-103	....do	2.6×10^{7}	1.6×10^{6}
Neptunium-237	Feed for producing plutonium-238	2.5×10^{7}	1.6×10^{6}
Plutonium-238	Heat sources for space radioactive thermoelectric generator	8.5×10^{5}	1.4×10^{4}
Curium-241	Heat sources for radioactive thermoelectric generator	9.0×10^{5}	9.4×10^{4}
Americium-241	Smoke detectors	3.2×10^{7}	9.4×10^{4}

It is impossible to quantify a value for any of these isotopes without a detail study of their potential application. However, one can assume in the case of the noble metals, they would have a value equal to that paid for the naturally occurring species. For example, the current price of rhodium is approximately $22.50 per gram.

REPROCESSING COMMERCIAL SPENT FUEL

Senator WARNER. This administration has said that it wants to begin reprocessing spent commercial fuel. The details as to how that will be done remain to be worked out. If you do begin reprocessing, what will you do with the plutonium that is extracted?

ANSWER. The administration does not plan to reprocess commercial spent fuel. On October 8, 1981, the President lifted the indefinite ban on commercial reprocessing in the United States. He stressed that the private sector should take the lead in developing commercial reprocessing. With regard to the uses of plutonium from commercial reprocessing, a determination on how the plutonium is to be utilized depends on may factors, such as the timing and magnitude of commercial reprocessing services and also the requirements and sources of plutonium for the U.S. breeder program. The President has directed the Office of Science and Technology Policy to work with the Department of Energy on a study of plutonium supplies for the Government. This study is still in progress.

Senator WARNER. Let's discuss for a moment the economic implications of this provision. Assuming that you don't use commercial spent fuel for plutonium, what is it going to cost to get needed plutonium from military-only sources? Aren't you going to have to build one or more new reactors?

ANSWER. The incremental cost to obtain needed incremental plutonium over the next decade from military-only sources will be of the order of $2 billion. A new reactor could not be built in time to contribute significantly to this supply. The purpose of a Replacement Production Reactor (RPR) is to ensure that critical nuclear weap-

ons materials, especially tritium, are continuously available in the mid-1990's to sustain the viability of the nuclear weapons stockpile. The Savannah River reactors (South Carolina) are in their 27th year of operation and, by the mid-1990's, will exceed 40 years of age. N Reactor at Richland, Washington, has a design life limiting graphite moderator and will reach the end of its design life in the 1992–1995 time frame (it would be 32 years old). It is prudent to proceed with plans to replace our weapons materials production reactors, due to the long leadtime required to achieve production operations. An RPR and associated fuel cycle facilities would cost between $3 and $6 billion in fiscal year 1982 dollars, depending on the type of reactor selected.

Senator WARNER. Assuming that you do use commercial spent fuel for plutonium, how much will that cost? Would you simply buy plutonium from a commercial reprocessor or would build the capability for defense to reprocess the spent fuel?

ANSWER. The Department of Energy has no plans to utilize spent nuclear fuel from civilian power reactors as a source of plutonium for nuclear weapons. However, in his recent statement on nuclear policy, the President directed that an interagency review be undertaken of the feasibility and desirability of purchasing plutonium for DOE programs from the private sector as a possible incentive for commercial reprocessing. This review is in progress and no recommendations or proposals are yet before us. Very roughly, the value of commercial plutonium based on its neutronic value (energy value) is about $25.00 per gram.

DEFENSE WASTE STUDY

Senator WARNER. Title VIII of the bill, as reported by the Environment and Public Works Committee, requires a study of defense wastes. This provison is similar to a provision authorized by Senator Jackson and included in last year's Act authorizing DOE Defense Programs. I am referring specifically to Section 213 of Public Law 97-90, signed by the President on December 4, 1981. Mr. Secretary, what is your position on Title VIII as it appears in S. 1662?

ANSWER. Section 801 (a) and (b) of title VIII of the Committee on Environment and Public Works version of the bill calls for a report very similar to that required by Public Law 97-90. The Department will deliver that plan in June 1983. Section 801 therefore duplicates Public Law 97-90. The issue of utilizing a commercial repository will be addressed in the context of Public Law 97-90 but may have to be deferred until a commercial repository is closer to reality.

COMMERCIAL REPOSITORY FOR DEFENSE WASTE

Senator WARNER. Subsection 801(c) directs the President to consider using a commercial repository for defense waste. (It is interesting to note that this is in direct contradiction to subsection 202(c) of the Energy Committee version which prohibits placing defense waste in a commercial repository.) In doing the study required by Public Law 97-90, would you consider the option to put defense waste in a commercial repository?

ANSWER. Yes, the Department would consider putting defense waste in a commercial repository provided there would be no adverse impacts on national security programs.

Senator WARNER. Considering the pace of the defense nuclear waste program versus the commercial nuclear waste program, isn't it more likely that there will be a defense repository long before there is a commercial repository and that it may be appropriate to consider putting commercial waste in a defense repository?

ANSWER. There is no defense program leading directly to a high level waste repository. The requirement for a separate defense repository cannot be determined until waste acceptance criteria for a commercial repository are available. With this information, a determination could be made as to the national security constraints on disposal of defense wastes at a commercial repository. Thus, the need for a separate defense facility would be established. The emplacement of commercial waste in a defense repository is not considered. Public Law 97-164 authorizes the Waste Isolation Pilot Plant as a research and development facility to demonstrate the safe disposal of defense waste. Construction will be complete in 1988 and first waste received in 1989. High level waste will be emplaced for experimental purposes only and will be removed once the experiments are completed.

Senator WARNER. Subsection 801(d) would impose several regulatory constraints on a defense-only repository. Do you see any need for such constraints?

ANSWER. No. We stated earlier, any benefits to be derived from extensive state and tribal involvement is siting (section 403(a)) a defense repository would not offset the potential harm to national security interests. National security information

could be derived from public disclosure on the volume and characteristics of defense high level waste and transuranic waste, thereby disclosing senstive information and jeopardizing national security interests. The Department, therefore, opposes open-ended state and tribal participation in siting a repository for defense waste.

TRANSURANIC WASTE

Senator WARNER. As I understand the situation, there are two categories of transuranic waste: defense-related transuranic waste and so-called commerical transuranic waste. Is it true that (as indicated in a DOE report entitled "Department of Energy Acceptance of Commercial Transuranic Waste" dated February 1980 most of the "commercial" transuranic waste is resulting from decommissioning and decontamination of private facilities which performed services for civilian research and development programs sponsored by DOE or its predecessors, and from private fuel research and development work?

ANSWER. Yes. Approximately 75 percent of the commercial TRU waste to be disposed within the next few years results from decontamination and decommissioning of facilities that have been used for government sponsored research and development.

Senator WARNER. Is the DOE report also correct in indicating that the amount of commercial transuranic waste is only a fraction of the amount of transuranic waste generated in defense-related activities, and that the amount will drop off significantly after decommissioning activities are completed?

ANSWER. Yes. After existing commercial TRU wastes are stored and or disposed of, commercial generation in the future will be less than 100 m^3/yr. Defense generation is estimated to remain at over 4000 m^3/yr for several years. Commercial generation would increase in the event of commercial reprocessing.

Senator WARNER. Is it true that there are no facilities currently available in the United States for the storage or disposal of commercial transuranic waste, particularly in concentrations greater than 10 nanocuries per gram?

ANSWER. Yes. Since the early 1970's Nevada and South Carolina have prohibited the acceptance of wastes containing trsnsuranic elements in concentrations greater than 10 nanocuries per gram. Effective February 1980, the only remaining State (Washington), with an operating low-level commercial waste burial site, modified the site license to prohibit the disposal of transuranic waste. There are no other commercial facilities licensed for acceptance of transuranic wastes.

Senator WARNER. Have representatives of NRC requested DOE to accept commercial transuranic waste in view of the lack of storage or disposal facilities and the obstacles this poses to decommissioning?

ANSWER. Yes. In a letter dated December 5, 1979, from J. B. Martin (NRC) to S. Meyers (DOE), and again in the Federal Register on December 20, 1979, (V44, No. 246). There have been several requests from commercial generators.

Senator WARNER. Does DOE have facilities with space sufficient to store existing "commercial" transuranic waste from decommissioning and decontamination activities and from private fuel research and development without undue intrusion on defense needs?

ANSWER. Yes. The capacity could be developed provided there would be no adverse impacts on national security programs.

Senator WARNER. The February 1980 report on "DOE Acceptance of Commercial Transuranic Waste" at pages 12 to 14 indicates that the primary obstacle to DOE acceptance of commercial transuranic waste is concern over possible lack of statutory authority. Is this the case?

ANSWER. No. It also assumes that there would be no adverse impacts on national security and that the NRC jurisdiction would end upon DOE acceptance of the waste. Other concerns are the need for assurance of full cost recovery. DOE would prefer not to compete with the commercial sector in providing waste storage services.

Senator WARNER. Is DOE opposed to legislation requiring DOE to accept "commercial" transuranic waste if DOE's costs were reimbursed by the waste generator and if no additional NRC licensing or NEPA requirements were imposed on account of the acceptance?

ANSWER. DOE would oppose legislation that would require acceptance of commercial TRU waste. DOE would not object to legislation that would permit DOE acceptance under the conditions stated, and provided that there would be no adverse impacts on national security programs, provided the legislation would not require an Environmental Impact Statement, nor NRC licensing of the required facilities for

storage and disposal, and that it does not inhibit DOE in the setting of waste acceptance criteria, charge schedules, and other contractual arrangements.

Questions Submitted by Senator Strom Thurmond

Senator Thurmond. During the Armed Services Committee hearing, I asked for the Department's most recent figures regarding the need for interim storage of commercial spent fuel and the dates by which it must be available. Please provide this information on a utility-by-utility basis, identifying the amount of storage space required by a utility and the date by which it is needed.

Answer. The following presents the Department's preliminary estimates of the Nation's spent fuel storage requirements. These storage requirements represent the additional storage capacity that must be provided in order to enable continued reactor operation. A report of requirements will be available in the near future.

Utility	Year additional storage capacity is first required (year) [1]	Cumulative additional storage capacity required through 1990 (MTU)
Virginia Electric & Power Co	1985	196
Carolina Power & Light Co	1986	179
Consumers Power Co	1986	90
Florida Power & Light Co	1986	214
Philadelphia Electric Co	1987	210
Boston Edison Co	1988	39
Rochester Gas & Electric Co	1989	25
Duke Power Co	1989	100
Northeast Utilities	1989	13
Northern States Power Co	1989	57
Power Authority—State of New York	1989	71
Yankee Atomic Electric Co	1989	29
Southern California Edison Co	1990	32
Dairyland Power Cooperative	1990	4
Total		1,259

[1] Assumptions: (1) Pool capacities increased to the maximum. (2) No transhipment except where licensed by the NRC. (3) Onsite transfers as planned. (4) Full core reserve capacity maintained.

DOE SPENT FUEL MANAGEMENT PROGRAM

Senator Thurmond. Please describe in greater detail than offered in this morning's hearing the commercial spent fuel management program at DOE.

Answer. The objective of the Commercial Spent Fuel Management Program is to establish the rod consolidation and dry storage technologies as licensed storage options through demonstrations with utilities. A licensed demonstration of BWR rod consolidation is scheduled for January 1983 at the Tennessee Valley Authority (TVA) Browns Ferry Plant. A licensed demonstration of dry cask storage is also planned at Browns Ferry and is scheduled to begin in June 1983. Another cooperative program will demonstrate the consolidation of PWR spent fuel assemblies on a licensed basis at a reactor, followed by the licensed shipment of consolidated rods in shipping casks and the unlicensed demonstration of a large capacity dry storage cask at a Government site. To support future utility licensing of this concept, data will be gathered on the integrity of fuel in dry storage during all these demonstrations. Since this aspect of the program is considered to be very important, additional tests outside of the demonstrations will also be conducted. The program will also continue to monitor the requirements and costs for additional at reactor storage capacity and will complete in fiscal year 1983 the joint U.S.-Japan Pacific Basin feasibility study.

UTILITIES AND NEAR TERM STORAGE PROBLEMS

Senator THURMOND. What has been the response of utilities other than TVA and Florida Power and Light to DOE's efforts to aid utilities with their near term storage problems?

ANSWER. In May 1981, the Department invited representatives from all nuclear utilities to a workshop on storage alternatives. Subsequent to the workshop, the Department contacted the utilities with near-term storage problems and eventually had discussions with 12 utilities. To date only the Tennessee Valley Authority and Florida Power and Light are willing to pursue cooperative programs. The general feeling among the other utilities is that although they have storage problems and support the concept of developing storage alternatives, they are reluctant to be the first to go through the licensing process. There are justifiable concerns on their part that the initial licensing proceedings may be protracted, not because of major technical problems but because of the nature of licensing procedures.

Senator THURMOND. During the hearing, Mr. Coffman described newer storage technologies, such as fuel rod compaction and dry storage as "adequate and ready to be deployed." Please provide greater detail regarding the technical issues, if any, left to be resolved, the licensing of these technologies, and their costs relative to Federal and private AFR's.

ANSWER. Currently, there appear to be no major technical issues which stand in the way of licensing either fuel rod compaction or dry storage. Discussions by the Department and the Nuclear Regulatory Commission have not identified any significant technical concerns with either technology. This is to be verified in DOE demonstration programs with utilities and will provide a sound basis for NRC's licensing of these new techniques.

With regard to costs, rod storage in reactor pools can provide significant increases in storage capacity at the relatively low cost of about $15/kg of spent fuel. A Department report, "A Preliminary Assessment of Alternative Dry Storage Methods for the Storage of Commercial Spent Nuclear Fuel," DOE/ET/4729-1, November 1981 contained cost information on various dry storage modes. Dry cask storage had a unit cost of about $120/kg of spent fuel. Large AFR facilities would cost less than at-reactor water basin storage due to economies of scale.

EXPEDITED LICENSING PROCEDURES

Senator THURMOND. Also during the hearing, Dr. Brewer described the expedited licensing procedures in Title III of S. 1662 as "very helpful." Please elaborate on how and to what degree these provisions will be helpful in reducing licensing delay and uncertainty.

ANSWER. Section 311 serves to limit the scope of licensing actions and thus the scope of intervention by providing generic licensing of storage techniques such as casks where there is essentially no site dependent element to their use. 10 CFR 71 goes even further in this regard with respect to fuel shipping casks where all licensing is associated with the cask alone.

Section 312 would solve a major problem which now exists. Presently if intervention takes place the utility is prevented from taking any action which would relieve storage congestion until the hearing process is complete. An interim license under section 312 would allow the utilities to embark on a course of action with some assurance that the expansion of storage capacity could not be denied them.

Section 313 provides a basis for limiting adjudicatory hearings and follow-on court actions which are primary contributions to the uncertainty in the timely availability of new technology for spent fuel storage.

Section 314 is also useful in that it removes an AFR storage facility from consideration as an alternative to on site storage thus limiting the scope of contentions to those over which the utility has some control.

In summary these sections focus on the main problem facing utilities which seek licenses to implement new storage technology. Even if they are frustrated when initially applied in licensing actions they provide the foundation for any future changes required to make them fully effective.

WASTE SOLIDIFICATION PROGRAM

Senator THURMOND. The statement was made during the hearing that the high level liquid waste at the Savannah River Plant could be solidified and stored there indefinitely. This is not an acceptable long term solution to the people of South Carolina. What are DOE's current plans and specific timetable regarding the estab-

lishment of permanent repository for military waste? Also, please provide a brief status report on the waste solidification program at Savannah River.

ANSWER. The high level wastes at the Savannah River Plant will be immobilized beginning in 1990 and will be shipped to a Federal respository for disposal as soon as it is available (present plans call for the late 1990's). Lag storage will be provided in facilities that can handle up to two years worth of plant output per module. At least one such module will be needed to assure that operations will not be interrupted due to lack of transportation. The lag storage facility can assure the safety of the waste for many years, as long as the site is actively protected consistent with plans for continued reactor operations at the site. DOE will store the high level waste products until they can be shipped to a repository. Should the repository not be available immediately upon completion of the immobilization plant, the high level waste would be stored in a vastly more stable form than at present.

The immobilized waste from Savannah River may be needed for high level waste experiments at commercial test and evaluation facilities and certainly at the Waste Isolation Pilot Plant. Routine disposal of high level defense wastes will occur at a commercial repository if there are no adverse impacts on national security programs. A defense waste repository will be developed if it is determined that disposal in a commercial facility is not appropriate.

The waste solidification program at Savannah River is proceeding very well. We will be pleased to provide a briefing if desired.

COMBINED OR SEPARATE NUCLEAR WASTE PROGRAM

Senator THURMOND. Mr. Davis, in your view, would a combined or separate program for nuclear waste, result in a faster resolution of the military waste problem?

ANSWER. Commercial and defense waste programs are separate now, and there is no technical reason to combine them. Separate programs will be more effective, because the unique requirements of the defense program would not interfere with the effective development of the commercial program, and vice versa.

QUESTIONS SUBMITTED BY SENATOR JOHN C. STENNIS

RESPONSIBILITY FOR WASTE MANAGEMENT

Senator STENNIS. Would you please give the administration's rationale for requesting that the siting of disposal facilities for defense wastes be exempt from the State and Indian tribe "right to participate in a process of consultation and concurrence, based on public health and safety and environmental concerns, in all stages of the planning, siting, development, construction, operation, and closure of a repository or a retrievable monitored storage facility that is required to be licensed by the Commission?

ANSWER. The administration believes that the responsibility for the management of waste from defense programs rests with the Federal Government and cannot be shared. The conduct of these programs must protect public health and safety and should not unncessarily suffer from interactions that could adversely affect national security programs, jeopardize national security information, or increase costs. There is significant potential for delays which cannot be accommodated by Defense Programs. The Federal Government's actions are subject to authorization, appropriations, and oversight by the U.S. Congress. Moreover, the Federal Government intends to work cooperatively with the states, such as is practiced in the consultation and cooperation agreement on the Waste Isolation Pilot Plant.

PROTECTION OF PUBLIC HEALTH

Senator STENNIS. Would you please give the administration's position on the desirability of the Nuclear Regulatory Commission's licensing of defense repository or retrievable monitored storage facilities?

ANSWER. Under present law, Sec. 202(4) of the Energy Reorganization Act of 1974, such facilities would be subject to NRC's regulatory jurisdiction, except if they are used for or are part of research and development activities. The introductory sentence in Sec. 202 recognizes that statutory exceptions may be made in the future to such NRC jurisdiction. At this stage of our research and development program, DOE has not yet reached a juncture at which any definitive decisions can realistically be made respecting non-R. & D. defense repositories, whether retrievable or otherwise, or the likely impact of any NRC involvement.

DISPOSAL OF RADIOACTIVE WASTE

Senator STENNIS. Would you please provide the administration's timetable for the ultimate disposal of defense radioactive wastes?

ANSWER. This timetable will be summarized in the plan requested by Pub. L. 97-90 and is reflected in the President's budget request for fiscal year 1983. Immobilization of defense high level waste will begin in South Carolina in 1990. This waste will be disposed in a Federal repository. This could be a commercial repository if there are no adverse impacts on national security programs. Otherwise, it would become necessary to develop a defense waste repository. The immobilized product can be stored safely if necessary until a repository is available. The technology for geologic disposal is in hand and will be demonstrated in the Waste Isolation Pilot Plant (WIPP) beginning in the late 1980's. The high level waste will be removed from the WIPP when the experiments are complete.

The WIPP project, which is described as Alternative 2 in the Final Environmental Impact Statement (FEIS), DOE/EIS-0026, October 1980, will be developed "as a defense activity of the DOE for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States" Public Law 96-164. Construction of permanent surface and underground facilities will proceed on a phased basis consistent with the evaluation of data obtained during the Site and Preliminary Design Validation (SPDV) program as defined in the FEIS. If significant new environmental data results from the SPDV program or other WIPP project activities, the FEIS will be supplemented as appropriate to reflect such data, and this decision to proceed with phased construction and operation of the WIPP facility will be reexamined in the light of that supplemental National Environmental Policy Act (NEPA) review.

The WIPP facility will dispose of defense transuranic (TRU) waste stored retrievably at the Idaho National Engineering Laboratory (INEL). By approximately 1990, all existing waste stored at INEL will have been removed to WIPP, and the WIPP facility would be in a position to receive and dispose of TRU waste from other defense waste generating facilities. In addition, WIPP will include an experimental facility for conducting experiments on defense wastes, including small volumes of defense high level waste. The high level waste used for experiments will be retrieved and removed from the site prior to decommissioning of the WIPP facility.

Senator STENNIS. What are the technical and national security reasons for preventing the storage of nuclear wastes which were generated by the civilian nuclear program in a defense geologic repository?

ANSWER. A defense repository will not be necessary unless national security considerations prohibit placement of defense high level wastes in a commercial repository. It is therefore improbable that the disposal of commercial wastes in a defense repository would ever be considered.

Senator STENNIS. Could the Defense geologic disposal effort in bedded salt contribute to data requirements of the Nuclear Regulatory Commission as the Commission considers alternative geologic media for licensing a geologic repository?

ANSWER. Yes, the Waste Isolation Pilot Plant (WIPP) Project effort will provide information related to bedded salt that may be used in the licensing process for commercial nuclear waste repositories. Through the Site and Preliminary Design Validation Phase and later experimentation, the WIPP will generate generic data (e.g. creep rate) on the use of bedded salt as a geologic host rock for a repository. This data will be available to both DOE's commercial nuclear waste management program and the NRC.

DEFENSE AND CIVILIAN NUCLEAR WASTE

Senator STENNIS. Would you please provide a summary of the administration's plan for ultimate disposal of both defense and civilian nuclear wastes? Please include major objectives, programs, and milestones in the description.

ANSWER. The objective of the Commercial Waste Management Program is to plan, develop and implement the technology and provide the facilities for terminal isolation necessary for the long term management and disposal of high level and transuranic radioactive wastes produced in the civilian sector primarily from the production of electricity.

The current overall program strategy is to identify three candidate geologic repository sites at which construction of exploratory shafts to depth will begin in calendar year 1983, to be completed by calendar year 1985. The three locations will likely be: in basalt flows on the Hanford Site; in welded volcanic tuff on the Nevada Test Site (NTS); and in a salt formation site to be determined in calendar year 1983. One of the three sites will be selected for the development of a Test and Evaluation

(T&E) Facility. This decision is currently scheduled for calendar year 1985. Parallel work on detailed site characterization, necessary before a decision can be made on determining the site or sites to be used for a full-scale licensed repository, will continue at all three sites. A license application for the first repository is scheduled to be submitted to NRC by 1988. The repository would be capable of accepting spent fuel in addition to solidified high level and transuranic waste.

The defense plan is in development as required by Public Law 97-90 and will be delivered to Congress by June 1983. The attached is a brief description of the defense waste strategy for your information until such time as the plan required by law is available.

Defense Nuclear Waste and Byproducts Management

History

A nuclear reactor occurred naturally in Gabon, Africa, 1.8 billion years ago. For hundreds of thousands of years, water provided moderation and the reactor operated every time it rained. Radioactive wastes, plutonium, and other byproducts did not migrate far and decayed in place. Radioactive "wastes" are also generated in nature by cosmic rays and by the decay of materials which have been around as long as the earth itself.

Man began to generate radioactive waste when M. Curie isolated naturally radioactive radium. Generation increased substantially during the "Manhattan Engineering District" which produced the atomic bomb during World War II. The Atomic Energy Commission and succeeding agencies, such as the Department of Energy (DOE), continued the research, development, production, and testing of nuclear materials and weapons. These activities generate nuclear waste. Medicine, industry, national defense, and energy have all benefited from these programs. Along with these benefits has come the need to manage the wastes and useful byproducts. Radioactive wastes can be managed so that neither man nor his environment is harmed, but this requires a systematic approach to their handling and disposal.

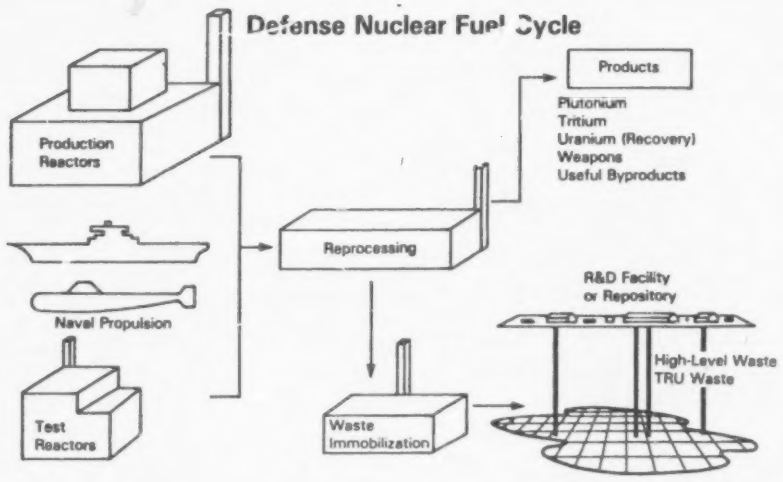
Management

Within DOE, the Assistant Secretary for Defense Programs is responsible for managing defense waste and byproducts such that the interests of public health, safety, and national security are protected. Program policy is developed at Headquarters in Washington, D.C. The implementation is delegated to operation offices near DOE sites and laboratories.

Goals

The primary goal is to close the nuclear fuel cycle for defense programs, that is: to utilize, or dispose of, nuclear wastes routinely, safely, and effectively. This goal will have been achieved when there will be no need to add to the inventories of stored waste for lack of a disposal system.

The second goal is to deal with the inventory of wastes and facilities from the past. This goal will have been achieved when the inventory has been reduced to normal operational levels and the backlog dealt with for the long term, either by immobilization and disposal or by stabilization in place.



Decisions and actions have been deferred for decades, one year at a time, because of institutional and budget constraints, and because there has been no immediate threat to health and safety. Because it costs less in the short run to do more research and development and to put off dealing with nuclear wastes except for a "holding action", the myth has perpetuated that technology is not available to close the nuclear fuel cycle.

The decision has been made to build and operate facilities to actually get the job done: such as an immobilization plant for high level waste at Savannah River in South Carolina, and a Waste Isolation Pilot Plant (WIPP) in Southeast New Mexico for demonstrating the disposal of defense wastes.

Byproducts

Material is considered to be waste if its use, or even storage for future use, is neither cost-effective nor desirable as a hedge against future shortage. Byproducts will be used automatically when there is a market for them. Private initiatives are encouraged for demonstrating the practical use of byproducts. Certain first of a kind demonstrations will be done by DOE when appropriate.

Byproducts include materials which can be used to sterilize sewage sludge, medical supplies, and even food (e.g. Med-fly infestation in 1981); and valuable materials (nickel, stainless steel) in contaminated equipment which can be recycled. Recovery of noble metals and other products of strategic importance that are contained in spent reactor fuel could become attractive, for example, if supplies from foreign sources were interrupted.

The recovery option can sometimes be maintained at no additional cost through simple process changes. Cesium recovered from high level waste salts can be immobilized, but it could instead be used beneficially for irradiation. Mercury may also be recovered and recycled. Noble metals may be separated along with the mercury and stored for use when economical. Such opportunities are being evaluated and implemented where appropriate.

Waste

In contrast to many hazardous chemical substances, all nuclear wastes eventually decay to harmless levels. Radioactive materials decay at precisely known rates: half of the activity is lost within one "half-life". Each radioisotope (material) has its own characteristic half-life and mode of decay. Materials with short-lived activity decay over short periods of time, while materials with long half-life persist longer. Long half-life denotes a slow rate of decay, or radioactivity, per unit of time.

The three major categories of waste are "high-level", "low-level", and "TRU" (contaminated with "transuranium elements"). High-level waste has high levels of short and long-lived activity and results from processing spent reactor fuels. Low-level waste contains (usually small) amounts of short-lived activity and arises mainly as regular trash in nuclear facilities. TRU waste is low-level waste which also contains more than a certain amount of long-lived (transuranic) activity. Precise definitions are contained in the Environmental Protection Agency standards and criteria, and in the implementing regulations of the DOE and the Nuclear Regulatory Commission.

Disposal

The cycle for low-level wastes is closed. These wastes are being permanently disposed by burial in trenches. The cycle for long-lived wastes has not been accomplished. Long-lived high-level and TRU wastes are being stored pending disposal.

The WIPP, an underground research and development facility in bedded salt, will demonstrate the closure of the defense fuel cycle for long-lived wastes. They will be handled routinely in normal operational quantities and retrievably disposed . Later, a decision will be made either to retrieve all wastes (as planned for high- level wastes) or to leave in place (as planned for TRU wastes if the demonstration is successful). The WIPP is,

therefore, not just another experiment for handling a small volume of waste but a true pilot plant which will demonstrate the disposal of defense waste on a credible scale.

High-Level Waste

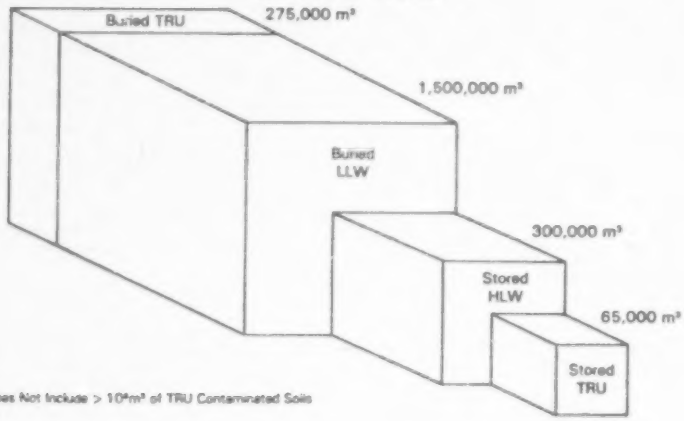
High-level wastes initially generate heat because they are very radioactive. The radiation is converted into heat as it is absorbed by surrounding material. Heat generation becomes negligible after a few hundred years when the activity is due mainly to transuranic elements. These wastes are stored as salt and sludge in tanks and bins at Savannah River, the Hanford Reservation near Richland, Washington, and in the Idaho National Engineering Laboratory. At Hanford, most heat producing isotopes (cesium and strontium) are removed, encapsulated in a solid form, and stored. All newly generated high-level waste is retrievably stored in double-shell tanks except in Idaho where it is retrievably stored as a dry powder (calcine).

Leaks of high-level wastes from Hanford tanks to the surrounding soil in the early 1970's led to the construction of improved double-shell tanks. All pumpable liquids at Hanford, and all high-level wastes at Savannah River, are being transferred to such new tanks. The remaining solids in the old tanks at Hanford are being "stabilized" (liquids drained) and "isolated" (all pathways for intrusion of liquids cut and sealed).

For the long term, high-level waste repositories underground with multiple barriers against intrusion by man and migration of radioactivity will be used for disposal. The radioactive substances will be embedded in a chemically inert matrix, such as glass, and packed in corrosion resistant canisters. Geologic media will provide additional barriers against the escape of radioactivity.

The high-level waste at Savannah River, where 70% of the activity in tanks is stored, will be dealt with first because the water table, climate, and population density near the site are less favorable than in Idaho and Hanford. The Defense Waste Processing Facility (DWPF)

Defense Waste Inventory*
(As of 1/1/82)



*Does Not Include > 10^4m³ of TRU Contaminated Soils

will immobilize the long-lived portion (and most of the short-lived portion) of the high-level waste for disposal off-site. Glass is the reference waste form.

Routine operations at 500 logs per year will begin in this decade. These logs will be available for research and development in geologic media, such as in the WIPP.

The inventories at Hanford and Idaho will be addressed sequentially after Savannah River.

Transuranic Wastes

Transuranic wastes contain certain long-lived radioisotopes of uranium and heavier elements, especially plutonium. Since the early 1970's TRU wastes have not been disposed by burial, but stored in drums and boxes pending disposal. Approximately 4000 m^3 are being added annually to the inventory of 65,000 m^3, of which 75% is stored at Idaho. About half of the 275,000 m^3 inventory of buried TRU is at Richland. There are also about 10,000,000 m^3 of slightly contami- nated soils at various DOE sites, primarily at Hanford.

Low activity TRU wastes may be disposed by burial, while more concentrated TRU wastes will be disposed of in deep geologic facilities.

Wastes that meet the acceptance criteria for the WIPP will be certified at the source and stored separately. Other wastes will require processing to meet the acceptance criteria. This can be done at less complicated facilities than is the case for high-level waste because less shielding is required. A Transuranic Waste Treatment Facility (TWTF) is planned for Idaho

Other Activities

Research and development provides the long term technology to manage byproducts and waste. Tasks include development of transportation systems, immobilization and volume reduction methods, evaluation of environmental impacts of disposal alternatives, and cost/benefit studies for selection of facilities and processes (e.g. centralized vs. decentralized).

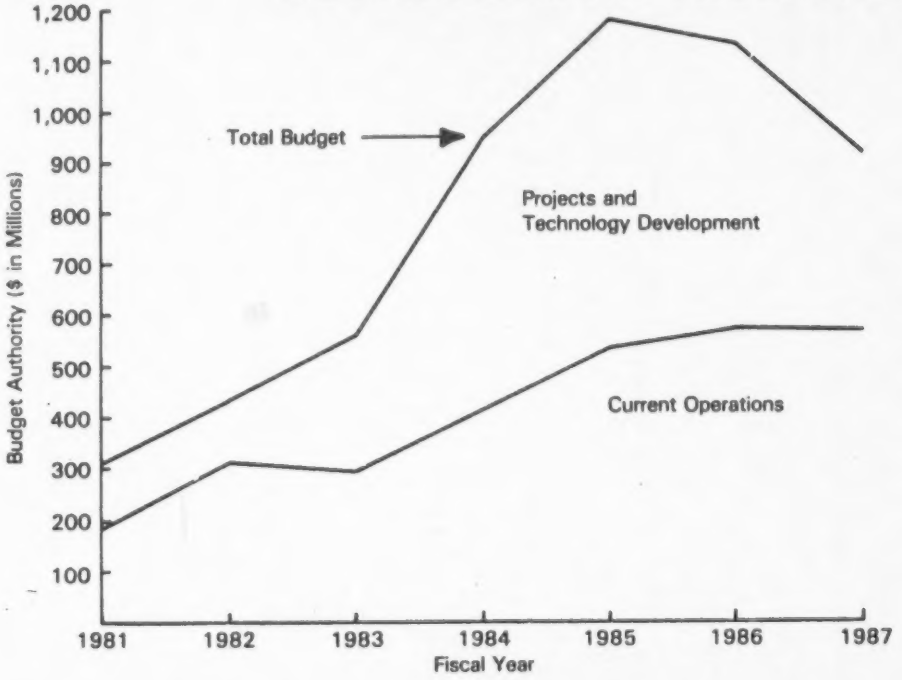
Generic support includes traffic management, reduced waste generation, certification of air (HEPA) filters, decommission of surplus facilities, and safety and quality assurance.

Conclusion

The defense fuel cycle is closed for low-level waste but has remained open for long-lived wastes which are retrievably stored pending the construction of facilities needed for disposal. The defense fuel cycle can be demonstrated to be closed for all nuclear wastes within this decade.

DEFENSE PROGRAMS
DEFENSE NUCLEAR WASTE

OUTYEAR BUDGET PROJECTIONS



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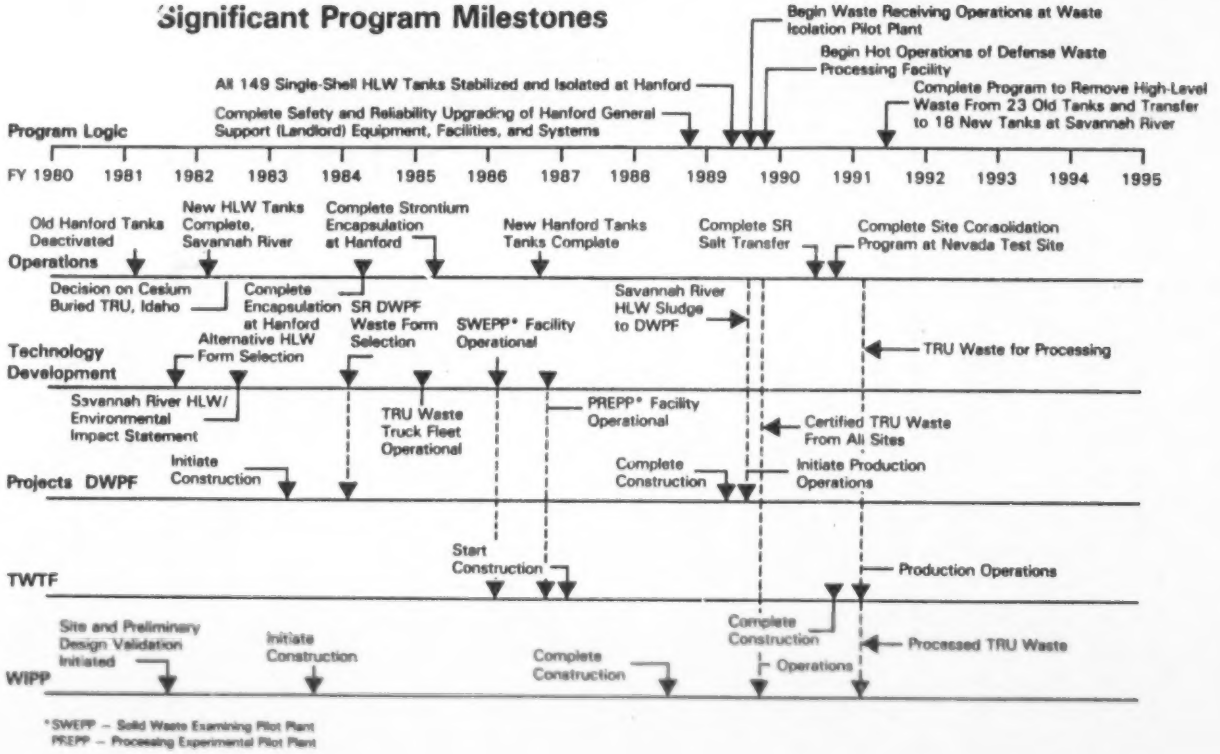
Significant Program Milestones


Begin Waste Receiving Operations at Waste Isolation Pilot Plant
Begin Hot Operations of Defense Waste Processing Facility
All 149 Single-Shell HLW Tanks Stabilized and Isolated at Hanford
Complete Program to Remove High-Level Waste From 23 Old Tanks and Transfer to 18 New Tanks at Savannah River
Complete Safety and Reliability Upgrading of Hanford General Support (Landlord) Equipment, Facilities, and Systems
Program Logic
FY 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995
Old Hanford Tanks Deactivated
New HLW Tanks Complete, Savannah River
Complete Strontium Encapsulation at Hanford
New Hanford Tanks Tanks Complete
Complete SR Salt Transfer
Complete Site Consolidation Program at Nevada Test Site
Operations
Decision on Cesium Buried TRU, Idaho
Complete Encapsulation at Hanford
SR DWPF Waste Form Selection
SWEPP* Facility Operational
Savannah River HLW Sludge to DWPF
Alternative HLW Form Selection
TRU Waste for Processing
Technology Development
Savannah River HLW/ Environmental Impact Statement
TRU Waste Truck Fleet Operational
PREPP* Facility Operational
Certified TRU Waste From All Sites
Initiate Construction
Complete Construction
Initiate Production Operations
Projects DWPF
Start Construction
Production Operations
TWTF
Site and Preliminary Design Validation Initiated
Initiate Construction
Complete Construction
Complete Construction
Processed TRU Waste
Operations
WIPP

*SWEPP – Solid Waste Examining Pilot Plant
PREPP – Processing Experimental Pilot Plant

Senator STENNIS. Couldn't the Waste Isolation Pilot Project site area be used as a geologic alternative for purposes of determining a site for a geologic repository for civilian high level wastes?

ANSWER. Under Public Law 96-164, WIPP will be developed "as a defense activity of the Department of Energy for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and program of the United States.'

NUCLEAR WASTE LEGISLATION

Senator STENNIS. What is the administration's position on enactment of nuclear waste legislation before completion of the special report required by Public Law 97-90?

ANSWER. The administration would like to see a commercial waste management bill enacted which does not address defense wastes. There is no need to await the report required by Public Law 97-90 regarding defense wastes before enactment of commercial waste management legislation.

QUESTIONS SUBMITTED BY SENATOR GARY HART

CIVILIAN WASTE REPOSITORIES

Senator HART. You testified, as I understand it, that the DOE intends to design and develop its civilian waste repositories so that they can accept defense nuclear waste. In detail, please state your reasons for opposing a legislative requirement that both defense and civilian nuclear waste be disposed of in the same repository?

ANSWER. Such a requirement would be premature until its impact on national security information and programs can be evaluated, i.e., until a commercial repository and the acceptance criteria for waste at that repository have been definitely established. This cannot occur until after a specific site has been identified, studied in sufficient detail, and acceptance criteria established.

Senator HART. Please specifically identify any duplication of costs (administrative, construction, etc.) that would result from a decision to build a separate set of repositories exclusively for disposing of defense nuclear waste.

ANSWER. It is anticipated that a system of repositories (two or more) will be required due to the projected inventories of defense and commercial wastes and the desirability of regional distribution. While a decision to construct a separate defense repository may result in an additional repository being constructed simultaneously with one for commercial wastes, the ultimate number of repositories will be the same because of inventory considerations. As such, while the time phasing of cost might change, the total magnitude would be comparable.

NUCLEAR WEAPONS STOCKPILE

Senator HART. Please specifically identify the elements of the national security that could be compromised by requiring the disposal of defense and civilian wastes in the same repository.

ANSWER. Nuclear weapons stockpile and weapons design information could be derived from public disclosure on the volume and characteristics of defense high level waste and transuranic waste, thereby disclosing sensitive information and jeopardizing national security interests. Any weapons program interruptions arising from the requirement for commingled disposal could jeopardize national security programs through delays and cost overruns.

Senator HART. If, in answering the previous question, you list the possibility of interference with the weapons production program as one of the elements of the national security, please explain how such interference could occur given:

(a) The fact that much of the defense waste has been stored for over 20 years awaiting disposal; and

(b) Your testimony during the hearing that solidification of these waste would allow DOE to store them on-site "indefinitely."

ANSWER. (a) Information on newly generated wastes could be used to derive current (chronologically and in terms of weapons technology) stockpile and weapons design information. Such wastes could only be stored onsite "indefinitely" from the safety standpoint. In fact, there would be practical limits to such storage.

(b) A decision to place all solidified defense waste in a commercial repository could, for example, delay waste processing and packaging operations pending site-specific repository criteria. Such delay could impact production capability because of

the limited availability of interim storage capacity at Savannah River and would increase cost of waste management there. The DWPF design provides for two year lag storage of solidified waste with provision for additional increments. While it may be technically feasible to store such waste "indefinitely," the operation and maintenance of such facilities is not planned and would not be economic relative to permanent disposal. Implementation of waste acceptance criteria for a commercial repository could also interfere with the immobilization of such waste prior to its storage.

Senator HART. In your testimony, you seemed to oppose giving States and Indian tribes the same rights to participate in decisions on the siting and development of defense waste repositories as Title VII of S. 1662 would give them for civilian waste repositories. Please explain this postition and specifically identify any elements of the nation . security that could be compromised.

ANSWER. The answer to question 3 also pertains to this question. Additionally, the open-ended participation envisioned in Title VII would invite delays in facility completion, thereby affecting production throughout. Additionally, it would invite disruption by intervenor groups in activities critical to the national defense.

Senator HART. Does the DOE intend to give impact assistance to states in which it decides to build a repository exclusively to dispose of defense waste?

ANSWER. Impact assistance to states where a defense waste repository was to be sited would be limited to that which is provided for in existing law. If Congress were to authorize additional impact aid, it would be provided.

NUMBER OF REPOSITORIES NEEDED

Senator HART. How many repositories would the DOE have to build if it decided to dispose of its defense waste in separate repositories? How many repositories would the DOE have to build if it decided to dispose of defense and civilian wastes in the same repositories? How many repositories does the DOE intend to build to dispose of civilian waste? What are the cost estimates for each of the above options?

ANSWER. One repository would suffice for the disposal of defense wastes projected to be generated in the foreseeable future. The regionalization concept for commercial repositories and anticipated inventories of commercial waste would call for two or three repositories over time. Because the ultimate number of repositories required is based on total volume of waste as opposed to source, it is anticipated that ultimate cost will be comparable whether a dedicated defense repository is required for national security reasons or not. A 72,000MT HLW repository would cost roughly $1.7 billion for construction, $3.3 billion for operation, and $0.2 billion for decommissioning.

U.S. NONPROLIFERATION POLICY

Senator HART. (a) You testified in response to a question from Senator Warner that you thought a decision to use the plutonium in commercial spent reactor fuel for building weapons would have an "insignificant" effect upon U.S. nonproliferation policy. Please explain that answer and, provide comments from the Department of State and the Arms Control and Disarmament Agency on your explanation.

(b) As I understand it, the success of our nonproliferation policy rests largely upon the ability of the U.S. to discourage nonnuclear weapons countries from diverting material from their civilian nuclear power programs to build weapons. Would the U.S. have the credibility necessary to discourage nonnuclear weapons countries from using their civilian nuclear programs to make weapons if the U.S. decided to do so? Please explain.

(c) In your prepared statement you note that the U.S. agreement with the IAEA permits the United States to remove safeguards requirements and shift civilian facilities and materials to the defense sector "if there is a national security need." If the U.S. exercised this right in order to use civilian plutonium to make nuclear weapons, would not this decision reveal a lack of good faith in our support for the international safeguards system and the IAEA? Please explain.

ANSWERS. The nuclear non-proliferation treaty (NPT) is silent on the right of a nuclear weapons state to remove safeguards requirements and to shift civilian facilities and materials to the defense sector if there is a need to do so. However, the U.S. safeguards agreement with the IAEA, which is an outgrowth of the NPT, does allow the U.S. to shift facilities out of the category to which IAEA safeguards apply for direct national security considerations.

Attempts by the United States to convince other nations to limit their activities that could affect proliferation by setting an example have failed spectacularly. For example, the ban on reprocessing of commercial fuels has greatly accelerated the

flow of information on this sensitive technology and has caused other nations to maintain or speed up their programs because they could not rely on the United States.

Non-nuclear states are relying on the ability of the nuclear weapons states to maintain international security and stability. The option to shift facilities or materials to the defense sector is required and might be needed to help maintain that stability.

In summary, we believe that maintaining the status quo will have an insignificant effect on nonproliferation policy (a); will not adversely affect U.S. credibility (b); and, will not constitute a "lack of good faith" (c).

We will ask the State Department and Arms Control and Disarmament Agency to comment.

LASER ISOTOPE R. & D. SEPARATION COSTS

Senator HART. Please estimate the total costs for research and development of laser isotope separation (LIS) technology? Please estimate the total costs of developing, constructing, and operating a production scale LIS facility? Please estimate the total cost of using commercial spent fuel to make nuclear weapons, including costs of R&D and all necessary facilities?

ANSWER. The total estimated cost during fiscal years 1980-88 for development of plutonium laser isotope separation (LIS) technology is in the range of one-half to one billion dollars, including research and development costs, and design and construction costs for a plutonium LIS production plant.

The DOE has no plans to utilize spent nuclear fuel from civilian power reactors as a source of plutonium for nuclear weapons. Nor are proposals to take such a step under active consideration. On the contrary, given the importance of maintaining a clear distinction between the peaceful and the military uses of nuclear energy as well as the serious domestic and non-proliferation implications of such a step, we would consider such an action only if absolutely essential for U.S national security.

Senator HART. Please estimate the total costs of developing, constructing, and operating a new plutonium production facility?

ANSWER. A replacement reactor would cost between $3 and $6 billion in fiscal year 1982 dollars, depending on the type of reactor selected.

Senator HART. Please estimate the chances that LIS technology can actually be used on a production scale. When does the DOE expect to use LIS technology on a production scale?

ANSWER. The Department is proceeding with experiments on LIS technology to determine its feasibility for use on a production scale. It is difficult to estimate the chances that LIS technology can be used on a production scale. We estimate that if developed, it could be used for cleanup of government-owned plutonium in the late 1980's.

Senator HART. Does the DOE plan to build a shear-leaching facility? If so, why does the DOE need to build one if it does not intend to reprocess commerical spent fuel to obtain plutonium for weapons?

ANSWER. The DOE is studying the possibility of modifying government-owned processing facilities to provide shear-leach capability.

The shear-leach facility would be needed to process special fuel for which that capability does not exist. These special fuels include fuel from the DOE-owned Fast Flux Test Facility (FFTF) and from certain research reactors.

This would provide the DOE with the capability to recover plutonium from these government-owned fuels.

This facility would also permit the reprocessing of commercial fuel to obtain plutonium for non-weapons uses such as the DOE reactor R&D program.

Senator WARNER. I thank you, Mr. Secretary and the other witnesses for your indulgence in very important but at points tedious questioning.

[Whereupon, at 10:15 a.m., the subcommittee adjourned, subject to the call of the Chair.]

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